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ABSTRACT

This report details a study by the United States General Accounting Office (GAO) of food safety in public schools. The study examined: (1) the frequency and causes of reported food-borne illness outbreaks associated with the federal school-meal programs; and (2) the practices that federal, state, and local governments, as well as other food providers, find useful for safeguarding meals. The study found that 195, about 3 percent, of the total of 7,390 food-borne outbreaks reported nationwide between 1990 and 1999 occurred in schools. Specific national data on whether these outbreaks were related to the federal school-meal programs do not exist; however, a survey of state health officials provided information on 40 large outbreaks from improper food preparation and handling practices in school kitchens. The study also found that state, federal, and local governments, as well as other food providers, use a variety of practices to safeguard meals. GAO recommends that the Centers for Disease Control modify its food-borne-outbreak reporting mechanism to add federal school meals as an outbreak category. GAO also recommends the promotion of training and certification of food-service workers and the study of the advantages and disadvantages of donating precooked or irradiated foods. (WFA)

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United States General Accounting Office

GAO

Report to Congressional Requesters

May 2003

SCHOOL MEAL PROGRAMS

Few Instances of Foodborne Outbreaks Reported, but Opportunities Exist to Enhance Outbreak Data and Food Safety Practices

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Highlights

Highlights of GAO-03-530, a report to Congressional Requesters

SCHOOL MEAL PROGRAMS

Few Instances of Foodborne Outbreaks Reported, but Opportunities Exist to Enhance Outbreak Data and Food Safety Practices

Why GAO Did This Study

More than 28 million children receive meals daily through the federal school meal programs. Providing meals that are safe is especially important because young children have a higher risk of complications from some foodborne illnesses. GAO examined (1) the frequency and causes of reported foodborne illness outbreaks associated with the federal school meal programs and (2) the practices that federal, state, and local governments as well as other food providers find useful for safeguarding meals.

What GAO Recommends

GAO recommends that the Secretary of Health and Human Services direct the Director of CDC to modify the Centers' foodborne outbreak reporting mechanism to add federal school meals as an outbreak category.

GAO also recommends that the Secretary of Agriculture direct (1) the Administrator of the Agricultural Marketing Service (AMS) to highlight its more stringent school-related procurement specifications on the agency's Web page and (2) the Administrators of AMS and the Food and Nutrition Service to further promote training and certification of key food service personnel and study the advantages and disadvantages of donating precooked or irradiated foods.

USDA and HHS agreed with this report's recommendations.

www.gao.gov/cgi-bin/getrpt?GAO-03-530.

To view the full report, including the scope and methodology, click on the link above. For more information, contact Lawrence J. Dyckman at (202) 512-3841 or dyckmanl@gao.gov.

What GAO Found

GAO found that 195, or about 3 percent, of the total of 7,390 foodborne outbreaks that were reported nationwide, between 1990 and 1999, occurred in schools. Specific national data on whether these outbreaks were related to the federal school meal programs do not exist; however, GAO's survey of state health officials provided information on 40 large outbreaks involving these programs. Nearly half of these large outbreaks resulted from improper food preparation and handling practices in school kitchens. Most commonly, foods involved in the outbreaks were contaminated with Norwalk-like viruses, which cause a mild gastrointestinal illness. However, data limitations make comprehensive assessment of the safety of school meal programs difficult. In particular, the reporting mechanism that states use to voluntarily report outbreaks to the Centers for Disease Control and Prevention (CDC) does not distinguish between outbreaks in schools involving the school meal programs and those involving food from other sources, such as brought from students' homes.

Federal, state, and local governments, as well as other food providers use a variety of practices to safeguard meals. Some of them may have national applicability to the federal school meal programs. For example, having key food service personnel trained and certified in food safety would address the improper food preparation and handling practices that caused most of the outbreaks reported in GAO's survey. Purchasing precooked or irradiated meat and poultry products could reduce the risk of foodborne illness in schools. Furthermore, the U.S. Department of Agriculture requires that some of the commodities it donates to schools be purchased under more stringent safety standards than the agency's regulatory requirements for meat and poultry processors. Currently, these more stringent procurement requirements are not readily accessible for school districts' use. While the practicality of applying these food preparation/handling and purchasing practices to the nation's schools has not been assessed, several food safety experts believe that applying these practices in all schools would enhance the safety of federal school meals. Some of these practices would likely lead to increased food costs for schools.

Source: USDA.

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Abbreviations

AMS	Agricultural Marketing Service
ASFSA	American School Food Service Association
CDC	Centers for Disease Control and Prevention
FDA	Food and Drug Administration
FNS	Food and Nutrition Service
FSIS	Food Safety and Inspection Service
HACCP	Hazard Analysis and Critical Control Point
HHS	Department of Health and Human Services
USDA	United States Department of Agriculture

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United States General Accounting Office
Washington, DC 20548

May 9, 2003

The Honorable Tom Harkin
Ranking Minority Member
Committee on Agriculture, Nutrition, and Forestry

The Honorable Richard G. Lugar
United States Senate

More than 28 million children receive meals daily in almost all of the nation's public schools, and in many private schools, through the federally funded National School Lunch Program and School Breakfast Program. The principal goals of these programs—which cost the federal government an estimated $8 billion in fiscal year 2002—are to provide low cost or free meals to children and to help support the agricultural economy. These meals are generally safe, but our analysis of data from the Centers for Disease Control and Prevention (CDC) shows that 195 outbreaks of foodborne illness were reported in schools between 1990 and 1999. These outbreaks involved about 12,000 individuals.[1] Food safety in schools is especially important because children have a higher risk of complications from some foodborne illnesses. For example, children are particularly susceptible to *Escherichia coli (E. coli)* O157:H7, a dangerous bacterium that has been found in undercooked meat and other foods and which can lead to kidney failure and death.[2] According to CDC, children between the ages of 1 and 9 have the highest infection rate for *E. coli* of all age groups. School food safety is also important because outbreaks involving school children have a greater number of illnesses on average. According to our analysis of CDC data, while school foodborne outbreaks from all schools constituted less than 4 percent of total U.S. foodborne outbreaks reported to CDC from 1973 through 1999, they were responsible for about

[1]Our analysis of CDC's school outbreak data includes outbreaks associated with public and private elementary and high schools. CDC school outbreak data also includes outbreaks associated with colleges and universities. We excluded these outbreaks in order to have outbreak data more relevant to our review.

[2]*E. coli* O157:H7 produces a potent toxin that damages the lining of the intestines. Severe abdominal cramping and bloody diarrhea characterize the resulting illness. About 2 to 7 percent of infections result in hemolytic uremic syndrome, which destroys red blood cells and causes kidney failure. Hemolytic uremic syndrome affects children more often than adults.

10 percent of all outbreak-related illnesses during this period. In fact, a single outbreak can involve many children. For example, in 1998, 1,700 individuals were sickened by burritos served by school cafeterias in several states.

The U.S. Department of Agriculture's (USDA) Food and Nutrition Service (FNS) administers the school meal programs at the federal level. At the state level, state education agencies typically administer and monitor the programs through agreements with local school districts' food authorities. FNS provides about 17 percent of the dollar value of food served at schools by donating commodities such as meats, poultry, dairy products, fruits, and vegetables. A key aspect of the programs is the removal of surplus commodities from the marketplace. Local school food authorities commercially purchase about 83 percent of the food served in the lunch and breakfast programs using federal per-meal cash reimbursements and, to a lesser extent, their own funds.

To prepare for the reauthorization of the Richard B. Russell National School Lunch Act and to improve the safety of school meals, you asked us to (1) determine the frequency and causes of reported foodborne illness outbreaks associated with the federal school meal programs and (2) identify practices that federal, state, and local governments as well as other food providers find useful for safeguarding meals from unintentional and deliberate contamination.[3]

To respond to your first concern, we analyzed CDC's foodborne outbreak database. CDC asks states to voluntarily report outbreaks of foodborne illness, but they are not asked to provide information on the frequency and causes of foodborne outbreaks specifically associated with the federal school meal programs. As a result, the database does not distinguish between illnesses caused by meals provided through the federal school meal programs and other sources, such as food brought from home. Consequently, we conducted a Web-based survey of state health officials that reported school outbreaks involving 50 or more individuals between 1990 and 1999 to determine which of these outbreaks involved federal

[3]GAO prepared an additional report describing nutrition in school meals to support the reauthorization of the Richard B. Russell National School Lunch Act. See U.S. General Accounting Office, *School Lunch Program: Efforts Needed to Improve Nutrition and Encourage Healthy Eating*, GAO-03-506 (Washington, D.C.: May 9, 2003).

school meals.[4] We also asked these survey respondents and other state health officials not included in our survey their opinions on how to enhance CDC's outbreak reporting mechanism. To respond to your second concern, we contacted food safety experts, including FNS federal school meals officials and officials from the American School Food Service Association (ASFSA)—the national school food service worker professional association, to identify school districts that are known to have useful food safety practices or are facing food safety challenges. In addition, we discussed useful food safety practices with state and local education and health officials. We also contacted private sector and other food providers regarding their useful food safety practices. Further details on our scope and methodology are discussed in appendix I.

Results in Brief

Our analysis of CDC data shows that 195 foodborne outbreaks in U.S. schools were reported from 1990 through 1999—representing about 3 percent of the 7,390 reported outbreaks during that period. Information provided to us by state health officials on 59 large outbreaks (involving 50 or more people) at schools shows that 40 were associated with meals served through the federal school meal programs. These outbreaks affected about 5,500 individuals. The remaining 19 outbreaks were caused by foods from other sources, such as students' homes. Nineteen of the 40 outbreaks related to the school meal programs resulted from improper food preparation and handling practices within the schools, while 8 outbreaks were due to foods contaminated before delivery to the schools, or to a combination of poor school preparation/handling practices and before-school contamination. It is not known where the food involved in the remaining 13 outbreaks was contaminated. In terms of the agents that caused the foodborne disease involved in these 40 outbreaks, we found that Norwalk-like viruses, which cause a mild gastrointestinal illness, were the most frequently reported agent. It is important to note that several data limitations make routine, accurate, and comprehensive assessments of federal school meal safety very difficult. As CDC points out, all foodborne illnesses, including those associated with federal school meals, are underreported. Moreover, the reporting mechanism that states use to voluntarily report outbreak data to CDC does not ask states to distinguish between outbreaks that are caused by foods provided through school meal programs and those involving foods from other sources. Food

[4]Because the outbreaks included in our survey are not a representative sample, the survey results cannot be generalized.

safety experts told us that one possible way of improving CDC's data would be to revise the reporting mechanism by adding a specific category for federal school meals. This could yield somewhat better data on the frequency and causes of reported foodborne illness associated with the federal school meal programs and help both FNS and state and local officials determine if additional actions are needed to reduce foodborne illness in schools. Forty-six health department officials we contacted in the 50 states and the District of Columbia concurred and said they could provide this additional information with minimal difficulty if asked to do so. Five health officials said that they could not provide this information.

Federal, state, and local governments, as well as other food providers, use a variety of practices that they consider useful to safeguard meals. These providers as well as other food safety experts told us that four of these practices have the potential to enhance the safety of the federal school meal programs. These practices offer the added benefit of helping to safeguard school meals from deliberate contamination. The four practices are (1) employing key food service personnel who are trained and certified in food safety practices, (2) implementing a risk-based approach for safely preparing, storing, and serving foods (such a system should identify potential hazards and establish controls to mitigate or reduce their occurrence), (3) purchasing precooked or irradiated meat and poultry products, and (4) applying the more stringent purchasing specifications that USDA uses when purchasing some of the food commodities it donates to schools. Specifically, USDA's procurement specifications require that these commodities be processed under safety conditions that exceed federal regulatory requirements for processing of meat, poultry, and other food products. Currently, these specifications are not easily found because USDA lists them in procurement documents undifferentiated from standard federal food safety requirements. The practicality of applying one, or some combination, of these four practices to the nation's schools has not been assessed. While experts believe that requiring these practices would enhance safety, mandating that school districts require training, a risk-based safety approach, and stringent procurement requirements would likely necessitate legislative changes at the federal level and lead to increased food costs for schools. Similarly, if USDA donated only precooked or irradiated products, food costs would likely increase.

To improve data on outbreaks that are directly associated with federal school meals, we recommend that CDC modify the reporting mechanism that states use to voluntarily report foodborne outbreaks. In addition, to enhance the safety of school meals, we recommend that USDA make its stringent purchasing specifications more readily accessible. We also

recommend that USDA further promote the training and certification of key school food service personnel in food safety practices. Finally, we recommend that USDA study the advantages and disadvantages of donating only precooked or irradiated meat and poultry. Since, as we recently reported, school meal programs' revenues in selected states have not kept pace with expenses, we stress that such a study should take added costs into consideration.

We provided HHS and USDA with a draft of this report for their review and comment. We received written comments from HHS and oral comments from USDA on the report's contents and recommendations. Both agencies agreed with the report's recommendations and provided technical comments, which we have incorporated as appropriate.

Background

USDA's Agricultural Marketing Service (AMS) and Farm Service Agency are responsible for procuring USDA-donated foods used to prepare meals for the National School Lunch Program and the School Breakfast Program.[5] AMS purchases meat, egg products, poultry, fish, nuts, and fruits and vegetables for donation; Farm Service purchases grains, oils, peanut products, dairy products, and other foods. USDA contracts for the purchase of these products with manufacturers that it selects through a competitive bidding process. FNS, through its Food Distribution Division, administers the program and donates foods to state agencies for distribution to schools to meet a portion of schools' needs. Schools then purchase the remainder of food for school meals using their own procurement procedures, either purchasing foods directly from manufacturers or distributors or contracting with food service management companies that procure the foods for them.

USDA and the Food and Drug Administration (FDA) have ongoing responsibility for ensuring the safety of the nation's food supply. USDA regulates meat, poultry, and egg products, while FDA regulates all other foods. Within USDA, FNS provides food safety guidance to schools and state agencies that emphasizes proper food handling and personal hygiene. For example, FNS provides schools manuals that address appropriate temperatures for reheating ready-to-eat foods and for maintaining foods at appropriate temperatures to avoid hazardous contamination. Similarly,

[5]The School Breakfast Program is authorized by the Child Nutrition Act of 1966, as amended.

FNS provides information on employee personal hygiene and how it relates to cross-contamination of foods. FNS also provides schools posters and other food safety-related materials.

As we have reported, CDC monitors foodborne diseases through a variety of systems. The one most relevant to this review is the Foodborne Disease Outbreak Surveillance System, created in 1973 to collect data about cases of foodborne disease contracted by two or more individuals as a result of ingesting a common food.[6] The system covers all 50 states, the District of Columbia, Guam, Puerto Rico, and the U.S. Virgin Islands and all types of pathogens, including bacteria, chemicals, parasites, and viruses. In the event of a foodborne outbreak, state and local public health department officials can voluntarily provide data to the system about the pathogen that caused the outbreak, if known; the contaminated food that was involved; and factors that contributed to the outbreak. These officials submit this information to CDC using a paper form or its electronic counterpart. Analysis of the data shows whether outbreaks occur seasonally and whether certain foods are more likely than others to contain pathogens. The data help focus public health actions intended to reduce illnesses and deaths caused by foodborne disease outbreaks. The data also helps public health officials identify critical control points in the path from farm to table that can be monitored to reduce food contamination. However, the data from this system do not always identify the pathogen responsible for a given outbreak; such identification may be hampered by delayed or incomplete laboratory investigation, inadequate laboratory capacity, or inability to recognize a particular pathogen as a cause of foodborne disease. In addition, according to CDC officials, the outbreak surveillance system does not distinguish whether the source of a school foodborne outbreak was from the federal school meal programs or other sources such as food brought from home.

Foodborne outbreaks that have recently occurred in schools include the following:

- From October 1997 through October 1998, 16 outbreaks of foodborne illness associated with eating burritos occurred in 7 states. All but one of these outbreaks occurred in schools, and most of the approximately 1,700 victims were children. Children involved in this outbreak became ill

[6]See U.S. General Accounting Office, *Food Safety: CDC Is Working to Address Limitations in Several of Its Foodborne Disease Surveillance Systems*, GAO-01-973 (Washington, D.C.: Sept. 7, 2001).

shortly after consuming the burritos. The cause of the outbreak was never determined.

- In March 1997, an outbreak of hepatitis A caused by contaminated strawberries donated by USDA sickened more than 200 teachers and students in Michigan and about 50 people in other states.[7] Thousands of other students in the affected states received gamma globulin injections as a preventive measure after being exposed to the contaminated strawberries.

- In October 1998, 11 children were infected by *E. coli* O157:H7 in school lunch taco meat in Finley, Washington. Three of these children developed hemolytic uremic syndrome, a potentially fatal disease that can result in anemia and kidney failure. A jury found that the school district was at fault and awarded $4.75 million to the affected children, including at least $3.8 million for one child who is expected to need multiple kidney transplants in her lifetime. This award is currently being appealed.

School Meals Caused the Majority of Foodborne Outbreaks in Our Survey of School Foodborne Outbreaks

Nationwide data on the frequency and causes of foodborne outbreaks associated with the federal school meal programs do not exist. But, according to our survey of state health officials, about two-thirds of the foodborne outbreaks involving 50 or more individuals that occurred in schools from 1990 through 1999 were caused by meals served through the federal school meal programs. In addition, our survey shows that nearly half of those outbreaks resulted from improper food preparation and handling practices within schools, such as improper food storage and poor food service worker hygiene. Recent studies conducted by CDC and FDA are generally consistent with our findings. However, the CDC study and our analysis point out that significant data limitations make it difficult to assess the overall safety of school meals nationwide. In particular, CDC's national database on foodborne outbreaks does not currently contain sufficiently detailed information on federal school meal-related outbreaks.

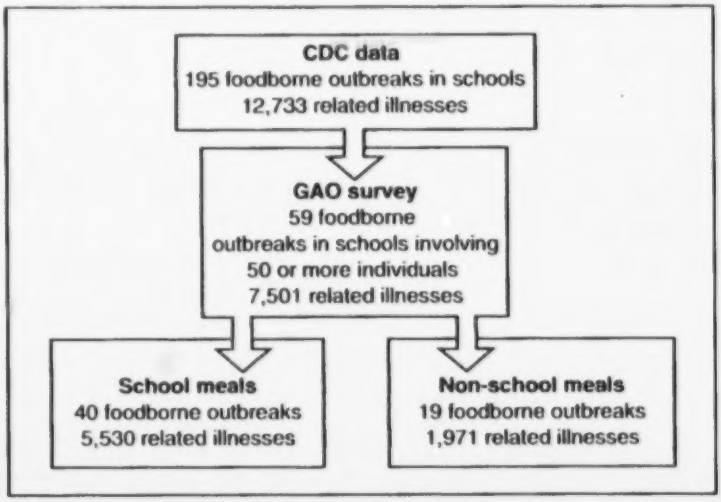
[7]Fatigue, poor appetite, fever, vomiting, and jaundice characterize hepatitis A infections.

Our Survey of State Health Officials Shows That about Two-Thirds of the Outbreaks We Examined Involved Foods Served through the School Meal Programs

Our analysis of CDC data shows that 195 foodborne outbreaks were reported in schools from 1990 through 1999. To obtain more information on federal school meal-related outbreaks than is currently available from CDC's database, we obtained data from health officials regarding 59 large school outbreaks that occurred in 25 states. Large outbreaks are those that involve 50 or more individuals. State health departments are typically involved in the initial investigation and subsequent reporting to CDC of foodborne outbreaks and are, therefore, able to provide more detailed information. Specifically, we asked state health officials whether foods served through the federal school meal programs, as opposed to foods brought into schools from home or other sources, were the cause of 59 large outbreaks that occurred in school buildings between 1990 and 1999.[8] The state health officials reported that, according to their outbreak investigations, the federal school meals caused two-thirds of the outbreaks (40 of the 59). Other foods eaten at schools, such as foods brought from home or foods served at special events (i.e., fundraisers) caused the other 19 outbreaks. Figure 1 shows the number of outbreaks that occurred in schools and the number of individuals who became ill after consuming breakfast and/or lunch provided through the federal school meal programs. Although our results cannot be generalized beyond the 59 large outbreaks included in our survey, they provide an indication of the frequency and causes of foodborne illness associated with the federal school meal programs.

[8]Outbreaks included in the survey are not a representative sample, and results from the survey are not projectable. Our survey did not include outbreaks that involved less than 50 individuals. Furthermore, many outbreaks that occur in schools are not reported, or the information provided to public health authorities is incomplete.

Figure 1: *GAO Analysis of CDC Outbreak Data and GAO Survey Responses* on Large School Outbreaks Associated with the Federal School Meal Programs, 1990-1999



Source: GAO and CDC.

Note: These data represent updated information provided by CDC since our report: U.S. General Accounting Office, *Food Safety: Continued Vigilance Needed to Ensure Safety of School Meals*, GAO-02-669T (Washington, D.C.: Apr. 30, 2002).

In addition to asking whether the reported outbreaks involved meals provided through the federally funded school meal programs, we asked state health officials about factors that may have contributed to the outbreaks. The officials reported that 19 of the 40 outbreaks associated with school meals resulted from poor food preparation and handling practices within school kitchens. These poor practices include inadequate cooking, improper food storage and handling, poor food worker hygiene, sick workers preparing food, and improper hot holding and cooling of foods. Specifically, improper food storage and poor food service worker hygiene were each reported in more than half of the 19 outbreaks caused by poor food preparation and handling practices. Improper holding temperatures for hot foods, improper food handling, and improper cooling of foods were other frequently reported problems that contributed to the outbreaks. Only 6 of the 40 outbreaks were caused by foods that were contaminated before delivery to the school: for example, strawberries contaminated with Hepatitis A and prepared burritos contaminated with a still unidentified substance. In 2 outbreaks, state health officials told us that food contaminated before delivery and poor food preparation practices within the school kitchen both contributed to the outbreaks. The

cause of the remaining 13 outbreaks attributed to federal school meals has not been determined.

Our survey also asked state health officials about the types of illnesses associated with federal school meal outbreaks. In 8 of the 40 outbreaks that the health officials attributed to the school meal programs, the agent that caused foodborne illness was never identified. However, of those that were identified, Norwalk-like viruses were the most frequently reported cause of illness, associated with 8 of the 40 outbreaks. Norwalk-like viruses cause a mild gastrointestinal illness that lasts for 24 to 60 hours and that can be transmitted through food or water contaminated by humans or from one infected person to another. *Staphylococcus aureus*, the second most common cause of illness, was reported in 7 of the 40 outbreaks. It commonly results in diarrhea and vomiting that start suddenly within 1 to 6 hours of eating a contaminated food. Patients generally recover within 2 days. *Salmonella* and *Clostridium perfringens* were reported in 5 and 4 of the 40 outbreaks, respectively. *Salmonella* causes a gastrointestinal illness and can lead to other serious health problems, including arthritic symptoms and blood poisoning. *Clostridium perfringens* causes intense cramps and diarrhea. Illness is usually over within 24 hours, but some symptoms may persist for 1 to 2 weeks. The remaining 8 of the outbreaks involved other disease-causing agents, including *Shigella*, hepatitis A, and *Bacillus cereus*.[9] Appendix II provides further information about our survey to state health department officials.

CDC and FDA Studies Are Generally Consistent with Our Findings Regarding the Causes of These Outbreaks

CDC recently reported on outbreaks that occurred in schools between 1973 and 1997.[10] That report was not specific to federal school meal outbreaks; moreover, it included colleges and universities. Although CDC's findings are generally consistent with those of our survey, CDC reported that the cause of illness in 60 percent of the outbreaks was unknown. In addition, CDC reported that *Salmonella* was the most frequent cause of illness (36 percent of outbreaks with a known cause of illness) while *Staphylococcus aureus* and *Clostridium perfringens* were the second and

[9]*Bacillus cereus* causes abdominal cramps and diarrhea that usually last for 24 hours. *Shigella* causes more severe abdominal cramps and diarrhea, usually lasting 5 to 7 days. Many strains of *Shigella* produce a potent toxin that destroys tissue.

[10]Daniels, Nicholas A. et al. "Foodborne Disease Outbreaks in United States Schools." The CDC study was published in the Pediatric Infectious Disease Journal, Volume 21, Number 7, July 2002.

third most frequently reported causes of illness.[11] CDC also reported that improper storage and holding temperatures and likely contamination by a food handler were the most commonly reported food preparation problems. As compared with our survey results, CDC reported that Norwalk viruses were the cause of illness in relatively fewer outbreaks, perhaps because tests for Norwalk-like viruses were unavailable for much of the time period covered in the CDC report, 1973 through 1997. In fact, in another recent CDC-sponsored study, CDC researchers suggested that Norwalk-like viruses are the likely cause of many outbreaks reported to CDC with unknown causes.[12] Our survey also identified fewer outbreaks of unknown cause than the CDC school foodborne illness study because our survey focused only on large outbreaks, which are more likely to be thoroughly investigated. Lastly, the CDC school illness study also points out limitations in the foodborne outbreak surveillance data, including underreporting of outbreaks.

In 2000, FDA reported on the occurrence of foodborne illness risk factors in food service facilities, including elementary schools.[13] FDA designed the study to provide a national baseline on the prevalence of different risk factors for foodborne illness. Specifically, investigators evaluated compliance with the 1997 FDA Food Code to determine the presence of risk factors.[14] Risk factors investigated fell into five categories: food from unsafe sources, inadequate cooking, improper holding temperatures, contaminated equipment, and poor personal hygiene. This study was also generally consistent with the results of our survey. The study found that the food safety risk factors most frequently found in elementary schools were improper handwashing by food service workers (47 percent of observations were out of compliance), improper holding temperatures of cold potentially hazardous foods (45 percent of observations were out of

[11]The differences between our results and CDC's results may be due to the fact that our analysis is based on a much smaller sample and a shorter time period than CDC used for its analysis.

[12]Fankhauser, Rebecca L., et al. "Epidemiologic and Molecular Trends of 'Norwalk-like Viruses' Associated with Outbreaks of Gastroenteritis in the United States." The CDC study was published in the Journal of Infectious Diseases, Volume 186, July 2002.

[13]Food and Drug Administration, *Report of the FDA Retail Food Program Database of Foodborne Illness Risk Factors*, August 2000.

[14]The Food Code represents FDA's guidance for a uniform system of regulation for ensuring that the foods sold or offered for human consumption in restaurants, grocery stores, schools, and nursing homes are safe, properly protected, and honestly presented.

compliance), and bare-hand contact with ready-to-eat foods (34 percent of observations were out of compliance).

The food preparation risk factors FDA found in elementary schools are very similar to the most frequent causes of outbreaks in schools that CDC reported and that we found through our survey of state health officials. Even though FDA's study focused on risk factors and not on actual outbreaks, all three studies found that holding temperatures and contamination by food handlers are key risk factors for foodborne illness. In particular, the FDA study demonstrates that food preparation deficiencies are underlying risk factors in all elementary schools and are not limited to elementary schools where outbreaks have occurred. All three studies demonstrate the importance of food safety training for school food service personnel in reducing school foodborne illness.

Available Data Limit Nationwide Assessment of the Frequency and Causes of Illnesses Associated with Federal School Meals

Several important data limitations make routine, accurate, and comprehensive assessment of food safety in the school meal programs very difficult. First, as CDC acknowledges, only a small percentage of all foodborne illness outbreaks are reported by state health officials. These health officials voluntarily report foodborne outbreaks to CDC using a paper or electronic form. Data from both of these forms are combined in the Foodborne Disease Outbreak Surveillance System. A key reason for underreported foodborne illnesses is that few people actually seek treatment. In addition, when people do seek treatment, few illnesses are properly diagnosed, confirmed through laboratory analysis, and then reported to the CDC surveillance system.

The substantial variability in reporting practices among states is a second data-limitation factor. Because CDC does not have statutory authority to require states to report foodborne outbreaks or any other diseases, states report on a voluntary basis. CDC officials told us that some states are more proactive than others in reporting foodborne outbreaks. In fact, our analysis of state outbreak reporting trends shows a wide variance in reporting practices across states. For example, from 1973 through 1999, reported outbreaks per 100,000 people ranged from 66 in Hawaii to 1 in Mississippi. Although CDC guidance defines a foodborne illness outbreak as two or more cases of a similar illness resulting from the ingestion of a common food, in practice, many states investigate and, hence, report only larger outbreaks often because of limited resources. Appendix III provides further information about CDC's outbreak data and the variations in reporting across states.

A third data-limitation factor is that the forms states use to voluntarily report outbreaks to CDC do not distinguish outbreaks associated with the school meal programs from other outbreaks that occur in a school setting. For example, a well-known 1997 outbreak caused by hepatitis A-contaminated strawberries is identified in CDC's database as having occurred in a school, but could not be attributed to the federal school meal programs. FNS and others acknowledge that the strawberries were served through the school lunch program.

To address this third limitation, we contacted state health officials in all 50 states and the District of Columbia to assess the practicality of adding the choice of "federal school meal" to the foodborne illness outbreak reporting form that states use to report outbreaks. Forty-six of the 51 health officials said either that they have the information needed to specify which outbreaks are due to the federal school meal programs or that they could obtain this information if they knew it was needed. Five health officials said that they could not provide this information. Finally, several health officials we contacted told us they were uncertain about the definition of a federal school meal. Consequently, any change to the CDC reporting form would need to include a precise definition of "federal school meal" for health officials to use. CDC defines any terms that might be unclear on the instructions that accompany the form. CDC officials have said that modifying the form has merit and would not be difficult, and they are amenable to such a change. Furthermore, several food safety experts we contacted said that making this change would yield somewhat better data on foodborne illnesses associated with the federal school meal programs. USDA's Food Safety and Inspection Service (FSIS) officials noted that this change might intensify investigative efforts to establish the food vehicle, the causative agent, and the likely point of contamination so that corrective and preventative measures can be implemented.[15]

[15]FSIS is the public health regulatory unit within USDA that regulates all meat, poultry, and egg products sold in interstate commerce.

Selected Government and Private Practices Could Enhance Overall Food Safety in Schools

Federal, state, and local governments, as well as other food providers, use a variety of practices to safeguard meals. According to several food safety experts we consulted, four of these practices could be applied in all participating schools to enhance the safety of the federal school meal programs. First, many of the school districts we contacted require training and certifying of food service workers. Second, several school districts use risk-based food safety procedures. These two practices could remedy a major cause of foodborne outbreaks identified in our study; namely, poor food preparation and handling practices. Third, several school districts purchase precooked meat and poultry products to help reduce the risk of foodborne pathogens, and some food safety experts suggest irradiating these products could also reduce these risks. Fourth, USDA's stricter food procurement requirements could help improve the safety of school meals. Lastly, after the events of September 11, 2001, most of the schools we visited had reviewed existing measures to prevent deliberate contamination of school meals, but had adopted few additional safeguards regarding food security. However, some food safety measures we identified during our review, such as restricting access to food preparation areas, could also help protect school meals against deliberate contamination.

Training and Certifying School Food Service Workers Enhance Food Safety

Nine of the 14 local school districts we contacted required training and/or certification of school food service workers to help ensure that foods served in the federal school meal programs are safe to eat. Food safety certification training addresses topics such as proper procedures to safely receive, store, prepare, and serve food. Food safety experts we contacted believe that certification provides a level of assurance that key personnel are trained in proper food safety practices.

The practice of also requiring certification of food service managers is widespread in the food service industry as well as in most of the schools we visited. Specifically, food service managers were required to be certified in food safety in 8 of the 14 schools districts we contacted. Moreover, as of January 2003, 17 states and 70 local jurisdictions in several additional states required or will require some form of training certification for food service managers, according to the National Restaurant Association Education Foundation.[16] This means that nearly

[16]Food manager certification requirements for Pennsylvania and Indiana become mandatory in July 2003 and December 2004, respectively.

60 percent of the U.S. population will soon consume food prepared by certified food service managers.

Similarly, several private sector food service providers we contacted, including Jack in the Box, a national restaurant chain, and Walt Disney World, also require food safety training and certification. For instance, a Jack in the Box representative told us that the company ensures that all its food managers are certified through the National Restaurant Association's "ServSafe" food-safety training program.[17] Jack in the Box also provides a 1-day modified "ServSafe" training course for key food service workers. In addition, Jack in the Box uses only certified trainers for its own training program and ensures that its workers are trained on critical food safety points at each restaurant workstation. The company also communicates the significance of food safety by showing its workers a video on food safety responsibilities and actual cases of foodborne illnesses and their impact on children. According to Walt Disney World representatives, the company requires that all its food establishments comply with state food safety certification requirements and uses both "ServSafe" and the National Register of Food Safety Professionals to train and certify employees. Food safety concepts introduced through training are reinforced on a daily basis through signs and newsletters and by providing food safety information on an intranet site.

Furthermore, the Veterans Health Administration, a division of the Department of Veterans Affairs that serves about 100,000 meals daily, requires 20 hours of food safety training annually for all food service workers. The Veterans Health Administration's health care facility managers also select key food service workers to be "ServSafe" certified. Lastly, food safety experts and advocacy groups we contacted, such as the AFSFA, the Conference for Food Protection, the Center for Science in the Public Interest, and Safe Tables Our Priority support the concept of mandatory nationwide training and certification of key food service workers, such as schools' food service managers, supervisors, or head cooks.[18]

[17]"ServSafe" includes training on topics such as foodborne illnesses; microbial contaminants; safe food handling, purchasing and receiving safe food, safe food storage, safe food preparation and service; and food safety regulation and standards.

[18]The Conference for Food Protection is a nonprofit advocacy group made up of food industry, government, academia, and consumer organizations that addresses food safety issues and certifies food safety training programs.

Certification courses for food service workers are available from several sources. Certification courses include that of ASFSA, the National Environmental Health Association, and others approved by the Conference for Food Protection, such as courses of the National Restaurant Association and the National Registry of Food Safety Professionals. As of February 2003, about 27,000 persons had been certified by ASFSA. Certification requirements may be fulfilled by completing the "Serving It Safe" food safety course developed by FNS and the National Food Service Management Institute.[19] In addition, 1.5 million food service workers have been certified by National Restaurant Association's "ServSafe" food safety training program.

While we found broad support for voluntary food safety training of food service workers, some stakeholders—certain school districts, state and local education and health agencies, and others—we contacted had mixed opinions about the need for or practicality of mandating certification requirements. Supporters believe that a federal certification requirement is a practical minimum threshold to help ensure safer food service operations in all school districts. Skeptics expressed concerns about the benefit of mandatory federal certification because of the costs and time involved in acquiring certification and monitoring and standardizing training programs. These concerns may be especially applicable to rural or small school districts. Officials at one school district where the health department requires all food service managers to be certified told us that they were barely able to pay for food service workers' examination fees, yearly certification costs, and textbook expenses, especially with the high turnover of food service employees. In addition, USDA officials say that such a mandate would necessitate a legislative change because USDA currently lacks such authority under the Richard B. Russell National School Lunch Act or the Child Nutrition Act of 1966.

Using Risk-Based Food Safety Procedures Strengthens Schools' Food Safety Efforts

Some school food service operations we visited were required by state or local health authorities to follow food safety procedures based on the Hazard Analysis and Critical Control Points (HACCP) system. HACCP is a risk-based system that identifies where contamination is mostly likely to occur and then establishes controls to prevent or reduce food

[19]The Institute is a congressionally established FNS-funded resource center at the University of Mississippi dedicated to continuous improvement of child nutrition programs. Its "Serving It Safe" course includes training on topics such as food safety, preventing foodborne illness, microorganisms, and sanitary food service.

contamination.[20] The school districts we visited used some aspects of the HACCP system for preparing, storing, and serving food. For example, they had easy-to-use HACCP-based inspection checklists, such as those provided by FNS or others for monitoring food service operations that enable supervisors to assess the implementation of food safety procedures, such as frequency of food temperature checks.

FNS supports and encourages voluntary HACCP training for school food service personnel. For example, FNS provides to schools the National Food Service Management Institute's "Serving It Safe" course, which is based on HACCP principles. The course helps food service workers understand risk-based principles and develop and implement a HACCP plan. Institute officials told us that, as of September 2002, over 250 individuals from 45 states had attended its Instructor Orientation to HACCP for Child Nutrition Programs. As a direct result of this training, these instructors provided local training to nearly 1,700 participants in 20 states. Several school districts, state and local educational and health agencies, and food safety experts told us that key elements of HACCP-based systems, such as monitoring food temperatures frequently, is very important for food safety. Some also said that having easy-to-use food inspection checklists to record HACCP-based practices should be required elements of any school food service operation. These checklists are available from a variety of sources, including FNS's HACCP-based voluntary guidance for school food safety. FNS also makes available on-line recipes that include HACCP information.

Private sector food providers we contacted also implement risk-based food safety approaches to food preparation and handling. For instance, Walt Disney World told us that it uses a HACCP approach in all its food service locations, which includes checking and recording the appropriate temperatures for cooking, hot holding, cold holding, cooling, and reheating of foods. The company also uses daily and weekly self-inspection checklists to monitor items such as employee hygiene, equipment and facility sanitation, food storage, pest control, and garbage disposal. To prevent or reduce cross-contamination, the company requires the proper use of gloves and differently colored cutting boards designated for

[20]HACCP is well known in the U.S. food processing industry. As part of their food safety oversight responsibilities, USDA and FDA require meat, poultry, seafood, and fruit and vegetable juice processors to use HACCP to limit the spread of foodborne disease-causing pathogens. Food establishments are required to adopt monitoring procedures, corrective actions, verification procedures, and record-keeping procedures.

different types of food. Officials from Sodexho, a national food service management company, said it uses similar food safety practices in its HACCP plan. The company employs an independent audit firm to verify compliance with the plan by conducting unannounced audits of its facilities. Finally, the Veterans Health Administration has a nationwide food safety policy that includes a HACCP requirement in all its facilities. Veterans Health Administration officials told us that monitoring devices are used to continuously record temperatures of food storage areas, even during power outages.

Some food safety experts said that mandating HACCP principles to all participating schools would enhance the safety of federal school meals. However, some school districts and state and local education and health agencies expressed reservations about mandating a comprehensive HACCP system, such as the one adopted by New York City, because of its costs. New York City's HACCP plan for schools, which is part of a program mandated by the city's Office of School Food and Nutrition Services, is 240 pages long. It contains detailed guidance, instructions, checklists, and logs for activities such as monitoring critical control points. Some school food service managers and others told us that small and rural school districts would be challenged to implement such an extensive effort. In addition, some food service managers told us that some HACCP requirements are complicated and could present a challenge to food service workers who may have limited educational backgrounds or who do not speak English as their primary language—common issues among school food service workers.[21] Also, school districts that do not cook meals from scratch but instead rely on prepackaged meals would need less extensive risk-based plans for food service workers. As a result, HACCP requirements would have to be modified to reflect schools' various food service operations. USDA officials told us that mandating HACCP in schools would necessitate a legislative change because USDA currently lacks such authority under the Richard B. Russell National School Lunch Act or the Child Nutrition Act of 1966. Lastly, if HACCP-based systems were used, several food safety experts told us that monitoring and enforcing these systems would be essential for their full effectiveness.

[21]Some school districts prepare or use food safety training and other materials in languages other than English. For example, officials from Montgomery County, Maryland's Food and Nutrition Service Division, told us that they offer food safety training in English, Spanish, and Chinese. Also, FNS is expanding its efforts to provide school food safety-related materials in Spanish.

Using Precooked or Irradiated Meat and Poultry Products Reduces Food Contamination Risks

According to some food safety experts, proper precooking or irradiation would eliminate or reduce potential pathogens from raw meat and poultry and thus decrease the possibility of foodborne disease outbreaks in school meals.[22] Some school districts, including six we contacted, use precooked meat or poultry products to a large extent. This practice is supported by several private sector food service providers and by food safety experts. Specifically, food safety experts state that purchasing meat that has been precooked to proper temperatures is an effective way to minimize the risk of *E. coli* O157:H7 and *Salmonella*, which are frequently found in raw meat, and in the case of *Salmonella*, raw poultry. By eliminating the need to cook raw meat items after they arrive at the school district, schools may also reduce labor costs and eliminate the need for some equipment. For example, in February 2001, the Minnesota Department of Children, Families & Learning's Food and Nutrition Service sent a notice to all school authorities recommending that all raw meat, whether obtained from USDA or purchased from commercial sources, be reprocessed into fully cooked products to minimize the risks associated with *E. coli* O157:H7 contamination. This advisory followed an *E. coli* O157:H7 outbreak in a Minnesota school.

USDA already purchases some precooked meat and poultry products for donation to schools and other nutrition programs. According to USDA's most recent study of nationwide school food acquisitions, in terms of cost, USDA provided more than half of the precooked ground beef and almost half of the precooked beef patties used at schools during the 1996-97 fiscal year.[23] However, USDA does not have similar information on its purchases of poultry products. Nevertheless, during fiscal year 2002, AMS purchased 16.4 million pounds of cooked diced chicken; 5.5 million pounds of cooked cut-up chicken; and 5.3 million pounds of cooked chicken fajita strips, patties, and nuggets for donation.

However, USDA officials said that precooking meat and poultry adds to the cost of those foods and could reduce the overall amount of USDA-donated commodities provided to local school districts. For example, raw chicken costs USDA about 50 cents per pound, and precooked chicken costs USDA about $1.35 per pound. Specifically, USDA officials told us that requiring USDA to donate only precooked meats or poultry would

[22]Irradiation involves exposing food briefly to radiant energy (such as gamma rays or high-energy electrons) to reduce or eliminated microorganisms that can contaminate food.

[23]USDA, *School Food Purchase Study: Final Report*, (Washington, D.C.: Oct. 1998).

decrease the amount of those commodities that USDA could donate by shifting more funds to pay for the costs of processing rather than the costs of acquiring raw products. It would also lessen the impact of USDA's efforts to remove surpluses of those commodities from the marketplace, one of the goals of the school meal programs. According to FNS officials, donating only precooked meats or poultry would reduce a given school district's ability to select the commodities based on local schools' preferences and specifications. Although there are no available costs estimates, some experts believe that the additional expense of precooking certain high-risk foods may be offset by the savings in health care costs associated with school foodborne outbreaks.

Another more controversial technique to reduce bacteria in meat and poultry is irradiation. Proper irradiation of foods would kill 99.9 percent of *Campylobacter jejuni* and *Listeria monocytogenes*, as well as *E. coli* O157:H7 and *Salmonella*—foodborne pathogens that are associated with meat and poultry.[24] FDA and USDA have approved irradiation for reducing pathogens in raw meat and poultry products,[25] and some food safety experts suggest that irradiation should be used on the meat and poultry products that USDA donates to the federal school meal programs. In addition, scientific organizations, including the American Dietetic Association, the American Medical Association, CDC, and the World Health Organization, have endorsed food irradiation. Other entities, however, such as the Consumer Federation of America, the Center for Science in the Public Interest, the Physicians Committee for Responsible Medicine, and Public Citizen, oppose serving irradiated foods to children pending more study on its long-term health effects. In 2000, we reported that scientific evidence indicates that the benefits of food irradiation outweighed the risks.[26]

USDA is taking actions concerning the possible introduction of irradiated food into the federal school meal programs, and a decision of whether to purchase irradiated products is pending. Currently, USDA does not donate

[24]*Campylobacter jejuni* is a bacterium that causes diarrhea and may cause fever, abdominal pain, nausea, headache, and muscle pain. Infection is most common in children under 5 and young adults.

[25]FSIS issued final regulations, effective in February 2000, that specified appropriate irradiation dosage levels.

[26]See U.S. General Accounting Office, *Food Irradiation: Available Research Indicates That Benefits Outweigh Risks*, GAO/RCED-00-217 (Washington, D.C.: Aug. 24, 2000).

any irradiated meat and poultry products to the federal school meal programs. According to USDA officials, a provision in the Farm Security and Rural Investment Act of 2002 directs USDA to allow any food safety technology approved by USDA or the Department of Health and Human Services, including irradiation, to be used for commodity purchase programs, including the federal school meal programs. In November 2002, USDA requested public comments on implementing this provision. USDA plans to publish its irradiation policy for commodity donations later on in 2003. USDA officials noted that costs are associated with the irradiation process and that irradiated products available in consumer markets cost more than nonirradiated products. Therefore, irradiating donated meat and poultry products could add to the cost of these foods and, without additional program funding, could reduce the overall amount of USDA-donated commodities provided to local school districts.

At the local level, federal regulations do not prohibit schools from serving irradiated foods should they choose to purchase them commercially. Although we found that irradiated meat and poultry are available in many parts of the nation for commercial purchase at local outlets or from food distributors, no schools are known to currently serve irradiated foods, according to the ASFSA and FNS. Regarding irradiation, food safety experts believe that certain issues need to be addressed, including whether the schools would serve irradiated foods, how related notifications to school children and their parents would be handled, and the extent to which students would have alternatives to irradiated food items. In this regard, FNS provided a grant to the Minnesota Department of Children, Families & Learning for development of an educational pilot that will include materials for school staff and parents regarding food safety and the use of irradiated foods as one option to ensure a safe food supply. USDA is to receive a final report on the pilot, including prototype educational materials by September 2003. Also, FNS plans to distribute to state agencies and school districts publications developed by FDA and FSIS to respond to common food irradiation questions.

Although precooking and irradiation may be viewed as key approaches to eliminating foodborne disease, food safety experts and USDA note that neither practice provides an absolute guarantee against foodborne disease and stress that proper preparation and handling of irradiated and precooked meats is still needed. USDA is reviewing the comments it received in response to a request for public input on these food safety technologies and has not made a final decision on implementation of the congressional mandate. Spokespersons for four entities we contacted—the Conference for Food Protection, the National Food Service

Management Institute, the National Restaurant Association, and Resources for the Future—and others caution that irradiating and precooking foods do not protect the food from recontamination through mishandling by food service workers during meal preparation.

USDA Has Established Contracting Specifications for Enhancing the Safety of Foods It Donates to Schools

As we reported in February 2000, USDA has established policies and procedures to further ensure the safety of foods purchased for donation to schools.[27] In particular, AMS's procurement contracts for school-donated foods include provisions that specify more stringent testing than is required by USDA's FSIS and by FDA. According to AMS officials, AMS developed these provisions because it believes that the nation's school children warrant food safety-related protections that are more stringent than those applied to the nation's population in general.

Under AMS's more stringent procurement specifications, suppliers of food products that pose microbial contamination concerns—i.e., beef, poultry, and eggs—are subject to stricter pathogen testing. Specifically, contracts for diced chicken specify pathogen testing for every lot because the product is susceptible to contamination. Also, while FSIS's regulations require that raw ground beef destined for the general public be subject to a series of random sample testing for *Salmonella*,[28] with a standard of no more than 7.5 percent of each sample being positive for *Salmonella*, AMS contracts require that all production lots of raw ground beef destined for school donation receive *E. coli* O157:H7 and *Salmonella* testing, both with a zero tolerance. Finally, AMS's procurement contracts establish specific temperature requirements during transportation from processing plants to the final destination. Accordingly, the trucks or railcars used to transport meat or poultry products and frozen or chilled fruit and vegetable products must have refrigeration units capable of maintaining the required temperatures. AMS also requires satisfactory annual plant surveys for suppliers of processed fruits and vegetables.

These procurement policies and procedures that are to safeguard foods donated to schools, do not apply to foods purchased by local schools. Since local schools purchase about 83 percent by value of the food served

[27]See U.S. General Accounting Office, *School Meal Programs: Few Outbreaks of Foodborne Illness Reported*, GAO/RCED-00-53 (Washington, D.C.: Feb. 22, 2000).

[28]FSIS regulations require that raw ground beef be sampled on consecutive days of production over a given period of time.

through the federal school meal programs, some food safety experts, such as representatives of the Conference for Food Protection and Resources for the Future, believe that USDA should require school districts to purchase foods according to AMS's more stringent specifications. However, mandating that schools use the stricter purchasing specifications would necessitate a legislative change because USDA currently lacks such authority under the Richard B. Russell National School Lunch Act or the Child Nutrition Act of 1966. Furthermore, USDA officials say that practical challenges exist for many schools in implementing its more stringent specifications. Specifically, food suppliers of small or rural school districts where there is limited competition for school business, might not bid for food contracts because of the increased cost associated with meeting the requirements. As a result, schools might face significantly higher costs and have access to fewer suppliers. Also, many districts do not purchase foods directly from processors but rather rely on food distributors, food brokers, and/or food service management companies to purchase the foods served in their schools. According to AMS, these businesses may be reluctant to pay higher wholesale prices for products meeting specific purchase requirements.

An alternative to mandatory purchasing specifications would be to make USDA's more stringent requirements more readily accessible to school districts and allow them to decide whether to use the requirements. Officials at several school districts we contacted and representatives from the Consumer Federation of America and Resources for the Future told us that having these food safety specifications readily available to schools for their own commercial food purchases would be useful in promoting food safety. Accessing such information is currently difficult because AMS lists these specifications in its commodity procurement documents along with, and undifferentiated from, standard federal safety requirements. For example, the few paragraphs containing stricter purchase specifications for microbiological testing are contained in a 28-page AMS commodity specification for frozen cooked diced chicken. AMS officials told us that the idea of extracting the specifications and prominently displaying them on the AMS Web page to make them more accessible to interested school officials has merit and would not be burdensome. AMS said that while these specifications are developed for specific processes and products and may be useful in helping schools develop their own food purchases specifications, they should not be applied universally to all situations and products.

As discussed earlier, the practicality of applying USDA's purchasing practices and other useful practices we identified to all the nation's

schools would depend on the size of the school district, the resources available to it, and the way each district prepares and serves meals. In addition, as we have recently reported, for school year 1996-97 through 2000-01 expenses associated with federally funded school meals in selected states have increased faster than revenues.[29] Nevertheless, some food advocacy organizations, including the Center for Science in the Public Interest and the Consumer Federation of America, believe that the absence of minimum national safety requirements for the federal school meal programs reduces the assurance that all school districts have basic food safety practices in place. They believe that creating national requirements for these programs would enhance the safety of school meals. Furthermore, the Center for Science in the Public Interest and other food safety experts believe that four food safety practices in particular—training and certification of food service workers, using risk-based food safety procedures, using precooked and irradiated meat and poultry products, and applying AMS's stricter purchasing specifications—warrant further study of their national applicability, including the advantages and disadvantages, such as increased costs. These experts believe that such a study should address school districts' resource constraints, the potential impact on the school meal programs' commodity surplus removal mission, and the need to request any specific legislative authorization.

Some School Districts Are Reemphasizing Food Security Practices after the Events of September 11, 2001

After the events of September 11, 2001, some school district officials said that they had reviewed their food security procedures for preventing deliberate contamination of school meals and while they found them to be adequate, were reemphasizing them. However, beyond reemphasizing existing procedures to prevent deliberate contamination, the school districts we contacted had not taken many additional measures to address food security. Several of the measures implemented to help ensure food safety, such as tight controls over loading docks where schools receive food deliveries or restrictions on access to food preparation areas, are equally important to improving security. Regarding new security measures, one district official had visited local food suppliers especially to review their food security practices to protect products such as bread, juice, and milk from deliberate contamination. Officials at other school districts that

[29]See U.S. General Accounting Office, *School Meals Programs: Revenue and Expense Information from Selected States*, GAO-03-569 (Washington, D.C.: May 9, 2003).

we visited told us that they routinely visit facilities of new or existing food suppliers to ensure the safety and security of suppliers' operations.

To strengthen school districts' efforts to prevent deliberate contamination of school meals, FNS has drafted school-specific food security guidance, which includes sections on supplier selection and personnel and operational security. This guidance will supplement more general voluntary guidance on food security that USDA and FDA have developed for dissemination to food producers, processors, and providers.[30] The voluntary guidance includes FSIS's 2002 security guidelines for meat, poultry, and egg processors, which contain sections on security for storing, shipping, and receiving food products.[31] As of March 2003, FNS had not established an issuance date for its guidance for school districts. We believe that this guidance is comprehensive and thorough and should facilitate school districts' efforts to better protect school meals from acts of deliberate contamination.

A more complete list of the useful school food safety and food security practices that we identified during our review is contained in appendix IV.

Conclusions

School and other government officials currently lack accurate and comprehensive data on the frequency and causes of foodborne illness outbreaks associated with the federal school meal programs. A more accurate picture of the magnitude and causes of foodborne illness outbreaks in the school meal programs is needed to determine how much to invest in food safety practices and where to focus resources. Such information is of particular importance because children have a higher risk of complications from some foodborne illnesses and because of the considerable financial investment by American taxpayers in the federal school meal programs. In addition to obtaining more accurate and comprehensive data on the frequency and causes of foodborne illness, options exist to help minimize the occurrence of foodborne outbreaks in schools at both the local and federal levels. However, the costs associated with implementing any additional measures should be carefully

[30]See U.S. General Accounting Office, *Food-Processing Security: Voluntary Efforts Are Under Way, but Federal Agencies Cannot Fully Assess Their Implementation*, GAO-03-342 (Washington, D.C.: Feb. 14, 2003).

[31]USDA, *FSIS Security Guidelines for Food Processors* (Washington, D.C.: Apr. 2002).

considered. As we recently reported, school districts in selected states experience year-end revenue shortfalls.

Recommendations for Executive Action

To improve nationwide data on the frequency and causes of foodborne illness associated with the federal school meal programs, we recommend that the Secretary of Health and Human Services require the Director of the Centers for Disease Control and Prevention to revise the reporting mechanism that states use to voluntarily report foodborne outbreaks. Specifically, states should be prompted to specify whether reported outbreaks involved foods served through the federal school meal programs.

To assist schools in their efforts to purchase safer food, we recommend that the Secretary of Agriculture direct the Administrator of the Agricultural Marketing Service to highlight on AMS's Web page the more stringent product safety specifications USDA uses when purchasing foods it donates to schools.

To enhance the safety of the federal breakfast and lunch programs in participating school districts, we recommend that the Secretary of Agriculture direct the Administrator of the Food and Nutrition Service to further promote training and certification of key school food service personnel in food safety practices by, for example, publicizing the range of food safety training and certification opportunities available to school food service personnel from ASFSA, the National Restaurant Association, and other sources.

To reduce the risk of bacterial contamination of food products USDA donates to schools, we recommend that the Secretary of Agriculture direct the Administrators of the Food and Nutrition Service and the Agricultural Marketing Service to study the advantages and disadvantages, including costs, of USDA donating only precooked or irradiated meat and poultry products to schools. Depending on the results of the study, the Secretary should consider whether to adopt these practices.

Agency Comments and Our Evaluation

We provided HHS and USDA with a draft of this report for their review and comment. HHS provided written comments and agreed with our recommendation. Specifically, HHS said that CDC is amenable to changing the outbreak reporting mechanism since many state health officials told us that they are willing to collect and report additional information on the

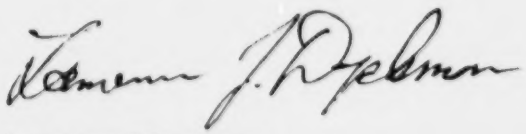
source of foods implicated in school-related foodborne outbreaks. HHS's comments are presented in appendix V.

USDA's Deputy Administrator for Special Nutrition Programs provided us with the agency's oral comments on April 15, 2003. USDA generally agreed with the report's contents and recommendations. In addition, USDA officials from the Agricultural Marketing Service, the Food and Nutrition Service, and the Food Safety and Inspection Service provided technical comments to enhance the clarity of the report. In particular, the officials wanted us to ensure that the report is clear regarding the scope of our survey and that its results cannot be projected. We have made modifications to address this concern. The officials also noted that improper food handling and poor worker hygienic practices are responsible for many outbreaks and that food contaminated prior to delivery to schools was found in a minority of outbreaks. We concur with this technical comment. As our report clearly states, the results of our survey indicate that food handling is a leading cause of foodborne outbreaks. Finally, the officials commented that irradiating meat products could add to the cost of these products, depending upon market conditions and diverse factors. They noted however that additional program funding, industry subsidies, or other factors could prevent any such cost increases or decreases in the amount of USDA-donated commodity. Our report acknowledges that additional costs would be involved and recommends that USDA study the advantages and disadvantages, including costs, of donating only precooked or irradiated meat and poultry products to schools.

We conducted our review from August 2002 through April 2003 in accordance with generally accepted government auditing standards. Appendix I contains the details of our scope and methodology.

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. We will send copies of this report to congressional committees with jurisdiction over food safety programs; the Secretaries of Agriculture and Health and Human Services; the Director, Office of Management and Budget; and other interested parties. We will also make copies available to others upon request. In addition, the report will be made available at no charge on the GAO Web site at http://www.gao.gov.

If you have any questions about this report, please contact Maria Cristina Gobin or me at (202) 512-3841. Key contributors to this report are listed in appendix VI.



Lawrence J. Dyckman
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and Environment

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Appendix I: Scope and Methodology

To determine the frequency and causes of foodborne illness associated with foods served through the federal school meal programs, we surveyed state health officials using a Web-based survey. We focused on state health officials because they are typically involved in the initial investigation and subsequent reporting to the Centers for Disease Control and Prevention (CDC) of foodborne outbreaks and are, therefore, able to provide more detailed information. The objectives of our survey were to determine (1) whether outbreaks listed by CDC were attributed to the federal school meal programs and (2) the feasibility of modifying CDC's Foodborne Disease Outbreak Surveillance System to gather more specific data about outbreaks associated with the school meal programs. Regarding the first survey objective, we asked state health officials in 32 states about 97 outbreaks, each of which, according to CDC's surveillance system, involved 50 or more individuals and occurred in schools between 1990 and 1999. Of the 97 outbreaks included in the survey, we excluded some from our analysis for the following reasons: states did not respond to our inquiries about 3 outbreaks; states responded but lacked sufficient information to answer questions about 22 outbreaks; and states reported that, according to their records, 13 outbreaks involved fewer than 50 individuals. The remaining 59 outbreaks in 25 states formed the basis of our analysis.[1] Because the outbreaks included in the survey are not a representative sample, results of the first part of the survey cannot be generalized. Regarding the second survey objective, to determine the views of all states on potential changes to the CDC reporting system, we also contacted officials in the 19 states and the District of Columbia that were not included in or did not respond to the Web survey and asked questions about the modification of the surveillance system identical to those in the second part of survey. To obtain perspective on our survey results, we reviewed relevant CDC studies that addressed the cause of foodborne outbreaks in schools in general and a FDA study that addressed the risk factors that contributed to foodborne illness in elementary schools. Lastly, we discussed with CDC officials and other food safety experts how CDC data limitations impact food safety assessments of the

[1]To simplify the analysis and presentation of outbreak causes, we defined "improper food preparation and handling practices" as including survey responses of improper food storage, improper food handling, inadequate cooking, poor food worker hygiene, ill food workers preparing food, improper hot-holding of foods, and improper cooling of foods.

federal school meal programs.[2] See appendix II for further information about our survey.

To provide additional information about foodborne illness outbreaks in general and to put school outbreaks into context, we examined data from all foodborne illness outbreaks that were reported to the CDC Foodborne Disease Outbreak Surveillance System from 1973 through 1999. We used these data to compare the frequency and magnitude of school outbreaks to those of outbreaks occurring in other locations. We also examined the variability of reporting practices across states. Our analysis of CDC data is presented in appendix III.

To identify the types of practices that federal, state, and local governments and private sector or nonschool meal providers have in place to protect against contamination of meals, we contacted 14 school districts, 8 state education or health departments, 4 local health departments, and 5 private sector or nonschool meal providers regarding their useful practices in food safety and/or security. We chose the school districts and other entities in consultation with several school food safety experts, including the American School Food Service Association (ASFSA) and federal school meal program officials from each of the 7 Food and Nutrition Service (FNS) regional offices. Using their recommendations, we identified and selected school districts with known useful food safety practices or food safety challenges. In making our selection, we considered district size, locale (rural, urban, or suburban), geographic location, and method(s) of meal preparation (central kitchen, satellite operations, or use of a food service management company). We conducted on-site reviews of schools' food safety and security practices at 11 school districts in 7 states—Illinois, Maryland, New York, Ohio, Rhode Island, Virginia, and Washington[3]—and the District of Columbia. At each location, we discussed efforts and challenges in food safety practices with school food authority officials and/or food service site managers. We discussed state operations and activities with officials in Ohio, Minnesota, Rhode Island, Washington, and the District of Columbia. To validate the useful

[2]The following limitations in CDC data make assessment of food safety in the federal school meal programs difficult: foodborne illness outbreaks are generally underreported, outbreak reporting practices vary among states because reporting is optional, and CDC's category of school does not distinguish separately federal school meals and also includes colleges and universities.

[3]We also contacted school districts in Florida and North Carolina to discuss food safety practices.

practices and challenges identified from our site visits, we also spoke with several food safety experts and advocates—ASFSA, the Center for Science in the Public Interest, the Conference for Food Protection, the Consumer Federation of America, Kids First,[4] Marler Clark,[5] the National Food Service Management Institute, the National Restaurant Association, Physicians Committee for Responsible Medicine, Resources for the Future, and Safe Tables Our Priority.[6]

To identify practices that other meal service-providing entities use to safeguard food that could be applicable to the federal school meal programs, and to validate the useful practices and challenges identified from our school site visits, we contacted several private sector or nonschool meal providers—Chef America, Jack in the Box, Sodexho,[7] the Veterans Health Administration, and Walt Disney World. We also contacted two healthcare organizations—the American Dietetic Association and the Joint Commission on Accreditation of Healthcare Organizations—to learn about policies these organizations use or suggest to safeguard the health of populations most vulnerable to foodborne illness. We selected these private sector or nonschool meal providers and other entities to obtain a wide range of useful food safety and security

[4]Kids First is a public/private partnership to improve health, nutrition, and education in Rhode Island school systems.

[5]Marler Clark is a law firm with extensive experience in representing victims of foodborne illness.

[6]Safe Tables Our Priority, a nonprofit organization, is devoted to assisting victims of foodborne illnesses, and providing public education and policy advocacy in safe food and public health.

[7]Sodexho, a food service management company, provides food and facilities management services to over 400 school districts.

practices, and we discussed with these entities their practices' potential applicability to the federal school meal programs. However, we did not independently evaluate these private sector or nonschool meal provider food safety practices. We also spoke with the private food safety experts and advocacy groups listed previously to further identify useful private sector food safety and security practices.

Appendix II: State Health Departments' Survey Results

To determine the frequency and causes of reported foodborne illness outbreaks associated with the federal school meal programs, we surveyed state health officials using a Web-based survey. This survey was divided into two parts. The objective of the first part of the survey was to gain additional information about school foodborne illness outbreaks involving 50 or more individuals between 1990 and 1999. Each survey addressed a single outbreak; thus, some states completed surveys for more than one outbreak. Of the 97 outbreaks included in our survey, 38 were excluded from analysis for the reasons described in appendix I. Results from the remaining 59 outbreaks are summarized herein. Though these survey results provide information on school foodborne illness outbreaks that affected 50 or more people, they are not a representative sample and are not projectable. The objective of the second part of the survey was to determine the feasibility of modifying CDC's Foodborne Disease Outbreak Surveillance System to gather more specific data about outbreaks associated with the federal school meal programs. For more information about the survey methodology, see appendix I.

The following summarizes the questions asked and the answers provided by the relevant state health officials that were able to provide details for the 59 outbreaks included in the first part of the survey. According to the survey respondents, 40 of the 59 outbreaks involved foods served through the federal school meal programs. The 40 school meal outbreaks described in this report are a subset of these data. The results of question 1 below have been recoded based on follow-up contacts with state health officials and our review of the completed surveys. Therefore, the response categories included for question 1 are different than those in the original survey.

	Food from the federal school meal programs	Coded as school meal based on telephone followup	Coded as school meal based on GAO analysis	Not a school meal
1. What was the source of the foodborne illness outbreak? n=59	8	23	9	19

2. How many cases of illness, confirmed and nonconfirmed, are believed to have resulted from this outbreak? n=59	Responses ranged from 50 to 400, with a mean of 130 and a median of 100.

3. To what extent, if at all, have each of the following foods been linked to the cause of the outbreak? n=59	Laboratory confirmed	Epidemiologically linked/not lab-confirmed	Suspected but not lab confirmed or epidemiologically linked	Not suspected to cause outbreak	No answer/ don't know
Meat and/or meat dishes	8	8	3	24	16
Poultry and/or poultry dishes	2	2	1	38	16
Fish/seafood	0	0	0	42	17
Eggs or egg products	0	0	0	40	19
Fruits/vegetables	0	8	0	36	15
Dairy	0	2	3	37	17
Baked goods	0	4	0	37	18
Pre-prepared foods (such as frozen entrees)	0	2	0	38	19
Combined foods (such as casseroles, sandwiches, or pizza)	2	8	3	28	18
Other	2	6	2	23	26

The following three items describe responses for all 59 outbreaks involving 50 or more individuals.

	Yes (a)	No, but there is strong epidemiological support for suspecting a specific causative agent (b)	No
4a. Was the agent suspected to have caused the outbreak isolated from the food? n=59	12	34	13

5a. If you selected answers (a) or (b), that there was at least strong epidemiological support for suspecting a specific causative agent, please indicate which agent is suspected. n=46	**Number of outbreaks**
Salmonella (non-typhoidal)	4
Salmonella Enteritidis	2
Listeria	0
Shigella	2
Clostridium perfringens	5
Bacillus cereus	1
E. coli O157:H7	0
E. coli (other)	0
Staphylococcal food poisoning	8
Campylobacter	0
Norwalk or Norwalk-like virus	16
Other (Narrative responses included 2 outbreaks of hepatitis A)	7
No answer	1

6a. What is/are the suspected underlying cause(s) of the outbreak? (Respondents were allowed to select more than one cause.) n=59	**Number of outbreaks**
Food contaminated prior to delivery to school	10
Contamination from children handling food at school	1
Inadequate cooking at school	7

6a. What is/are the suspected underlying cause(s) of the outbreak? (Respondents were allowed to select more than one cause.) n=59	Number of outbreaks
Improper food storage at school	13
Improper food handling at school	9
Poor food worker hygiene at school	13
Food worker illness at school	5
Improper hot holding at school	10
Improper cooling at school	5
Insect/rodent contamination at school	0
Other suspected cause at school (please specify)	7
Unknown	19

The following three items repeat the previous, but focus on the 40 outbreaks that involved federal school meals.

	Yes (a)	No, but there is strong epidemiological support for suspecting a specific causative agent (b)	No
4b. Was the agent suspected to have caused the outbreak isolated from the food? n=40	8	25	7

5b. If you selected answers (a) or (b), that there was at least strong epidemiological support for suspecting a specific causative agent, please indicate which agent is suspected. n=33	Number of outbreaks
Salmonella (non-typhoidal)	4
Salmonella Enteritidis	1
Listeria	0
Shigella	2
Clostridium perfringens	4

5b. If you selected answers (a) or (b), that there was at least strong epidemiological support for suspecting a specific causative agent, please indicate which agent is suspected. n=33	Number of outbreaks
Bacillus cereus	1
E. coli O157:H7	0
E. coli (other)	0
Staphylococcal food poisoning	7
Campylobacter	0
Norwalk or Norwalk-like virus	8
Other (Narrative responses included 2 outbreaks of hepatitis A)	5
No answer	1

6b. What is/are the suspected underlying cause(s) of the outbreak? (Respondents were allowed to select more than one cause.) n=40	Number of outbreaks
Food contaminated prior to delivery to school	8
Contamination from children handling food at school	0
Inadequate cooking at school	4
Improper food storage at school	11
Improper food handling at school	8
Poor food worker hygiene at school	11
Food worker illness at school	4
Improper hot holding at school	6
Improper cooling at school	5
Insect/rodent contamination at school	0
Other suspected cause at school (please specify)	0
Unknown	13

The following summarizes the results of the second half of the survey. These results include the 31 states that responded to the Web-based survey and the 19 states plus the District of Columbia that we contacted, totaling 51 respondents.

	Yes	Could obtain information if asked[a]	No
7. In the section asking, "Where was the food eaten?" under the selection "school," if a subcategory of "federal school meal" was added, would you usually have the information needed to answer this question? n=51	32	14	5
8. In the section asking "Where was the food prepared?" under the selection "school," if a subcategory of "federal school meal" was added, would you usually have the information needed to answer this question? n=51	32	14	5

Source: GAO.

[a]We included this option in the telephone survey but not in the Web-based survey. Respondents from the Web-based survey were included in this category if their comments in the open-ended "further explanation" portion of the question stated that they could obtain the information if asked.

Appendix III: GAO's Analysis of CDC Data

Using data from the CDC's Foodborne Disease Outbreak Surveillance System, we examined patterns in foodborne illness outbreaks in general and in school outbreaks in particular. We examined data covering the time period from 1973 through 1999, the last year for which complete outbreak data were available at the time of our review. Table 1 shows the total number of outbreaks, and the numbers of illnesses, hospitalizations, and deaths associated with them, that were reported over the entire period. Figure 2 shows the total number of reported outbreaks, and figure 3 shows the total number of illnesses.

Table 2 shows the number of reported outbreaks that resulted from foods in restaurants, private homes, schools, and other locations. It is important to note that this analysis does not identify foods that are served through the federal school meal programs. Overall, 4 percent of the outbreaks resulted from foods in schools; 54 percent from food prepared in restaurants; 15 percent resulted from foods in private homes; and 23 percent from foods in other locations, including churches, caterers, grocery stores, nursing homes, and a broad array of other locations. For about 5 percent of the reported outbreaks, the location was unknown. The percentage of outbreaks attributable to foods in schools fluctuated between 2.3 percent and 5 percent across the various 3-year intervals. As data supporting figure 4 show, the number of school outbreaks over the entire period follows a trend similar to the trends in outbreaks resulting from foods in restaurants and in private homes—that is, the numbers increased for all three groups of outbreaks between the early and late 1990s. Outbreaks resulting from foods prepared in the other locations increased somewhat more linearly over the entire period.

Interestingly, CDC data show that food outbreaks at schools involve larger numbers of illnesses than outbreaks that occur in other locations. Table 3 shows that over the entire period, the 547 reported outbreaks resulting from foods in schools produced 46,461 reported illnesses, approximately 10 percent of all illnesses. While each school outbreak caused 85 illnesses on average, each outbreak associated with foods from restaurants and private homes caused an average of 18 and 13 illnesses, respectively. Only the category of "other" outbreaks, which caused an average of 56 illnesses, approached the average number of illnesses associated with school outbreaks, most likely because many of the other outbreaks involve institutionalized populations (nursing homes, universities, prisons, etc.) as well. Similarly, school outbreaks tend to comprise a greater number of large outbreaks when we distinguish large outbreaks (involving 50 or more illnesses) from smaller ones. As the final column of table 3 shows, 51 percent of the school outbreaks over the entire period were large,

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compared with 7 percent of the restaurant-related outbreaks, 4 percent of the private home-related outbreaks, 25 percent of the other outbreaks, and 10 percent of the outbreaks of unknown origin.

In general, identifying the frequency and causes of school outbreaks in CDC's data is difficult because reporting of outbreaks to CDC is voluntary, and the reporting practices of states vary. In table 4, we show the number of outbreaks reported by each state over the entire period, classified according to where the food that produced the outbreak was prepared. The row totals reveal dramatic differences across states in the number of outbreaks reported over this 27-year period. Some states, like Delaware, Mississippi, Nevada, South Dakota, and Wyoming, reported fewer than 30 outbreaks in total, or only about 1 outbreak per year. Other states, like California, Florida, and Washington, reported over 1,000 outbreaks in the period, and New York reported over 3,000. States also differed in the locations in which their reported outbreaks occurred. While some states reported 20 or more school outbreaks in the 27-year period, other states reported only 1 or 2. Similar disparities exist across states in the percentage of outbreaks resulting from restaurant foods (ranging from 8 percent in Alaska to 73 percent in Washington) and in the percentage of outbreaks resulting from foods prepared in private homes (ranging from 4 percent in Arkansas to 50 percent in Alaska).

Some of these discrepancies may be due to differences among states in population and in such characteristics as the number of restaurants and the eating habits of residents. However, these differences in the number of reported outbreaks persist even after differences in population are crudely controlled. In table 5, we show the number of outbreaks over the entire period as a function of population size by dividing the number of outbreaks by the population of each state averaged from the 1970, 1980, 1990, and 2000 Censuses. The rate of outbreaks per 100,000 individuals during the 27-year period ranged from only 1 or 2 per 100,000 in some states to nearly 20, 30, or more than 60 per 100,000 in others. These data demonstrate that states with the largest number of reported outbreaks are not necessarily those with the largest populations. Moreover, the patterns in the 5 states reporting the largest numbers of outbreaks (see table 6 and figure 5) are extremely disparate. While the increase in the number of outbreaks in Ohio and the sizable decrease in the number of outbreaks in New York since the early 1980s may reflect declines or improvements in food handling or preparation in each state over time, these outbreak

patterns probably also involve changes in how each state reports foodborne outbreaks.[1]

After we completed our analysis, CDC published foodborne outbreak data for 2000 on its website. In 2000, 67 of the 1,413 reported outbreaks occurred in schools. These 67 outbreaks caused 2,987 illnesses. However, the 2000 data are not comparable to the numbers of school outbreaks discussed elsewhere in this report, because we refined the 1973 through 1999 data to exclude, for example, colleges and universities.

Table 1: Number of Reported Foodborne Outbreaks and Related Illnesses, Hospitalizations, and Deaths, 1973-1999

Year	Outbreaks	Illnesses	Hospitalizations	Fatalities
1973-75	1,260	48,537	1,906	41
1976-78	1,393	34,357	1,833	21
1979-81	1,739	43,057	2,177	66
1982-84	1,712	51,159	2,086	76
1985-87	1,381	63,004	4,328	94
1988-90	1,489	50,830	2,349	57
1991-93	1,456	40,215	1,735	31
1994-96	1,937	45,913	1,692	21
1997-99	3,464	70,411	2,013	47
Total	**15,831**	**447,483**	**20,119**	**457**

Source: GAO analysis of CDC data.

Note: The number of illnesses were reported for all outbreaks, though for 1 outbreak no illnesses were reported, and for 326 (2.1 percent) of the outbreaks only one illness was reported. The number of hospitalizations were not reported for 3,379 (21.3 percent) of the 15,831 outbreaks, and the number of fatalities were not reported for 2,638 (16.7 percent) of the 15,831 outbreaks.

[1]Outbreaks in Ohio increased from 15 outbreaks (1982-1984) to 287 outbreaks (1997-1999). Outbreaks in New York decreased from 658 outbreaks (1982-1984) to 204 outbreaks (1997-1999).

Table 2: Number of Reported Foodborne Outbreaks Resulting from Foods Prepared in Restaurants, Private Homes, Schools, and in Other Locations, 1973-1999

Year	Restaurants	Private homes	Schools	Other	Unknown	Total
1973-75	494	397	56	258	55	1,260
	39.2%	31.5%	4.4%	20.5%	4.4%	100.0%
1976-78	729	279	56	259	70	1,393
	52.3%	20.0%	4.0%	18.6%	5.0%	100.0%
1979-81	969	288	87	339	56	1,739
	55.7%	16.6%	5.0%	19.5%	3.2%	100.0%
1982-84	876	333	63	396	44	1,712
	51.2%	19.5%	3.7%	23.1%	2.6%	100.0%
1985-87	715	221	59	320	66	1,381
	51.8%	16.0%	4.3%	23.2%	4.8%	100.0%
1988-90	736	196	51	451	55	1,489
	49.4%	13.2%	3.4%	30.3%	3.7%	100.0%
1991-93	766	186	36	433	35	1,456
	52.6%	12.8%	2.5%	29.7%	2.4%	100.0%
1994-96	1160	221	45	466	45	1,937
	59.9%	11.4%	2.3%	24.1%	2.3%	100.0%
1997-99	2020	283	94	782	285	3,464
	58.3%	8.2%	2.7%	22.6%	8.2%	100.0%
Total	**8,465**	**2,404**	**547**	**3,704**	**711**	**15,831**
	53.5%	**15.2%**	**3.5%**	**23.4%**	**4.5%**	**100.0%**

Source: GAO analysis of CDC data.

Note: Restaurants include delicatessens and cafeterias. For our analysis, we excluded universities and colleges from the schools category. The other category includes churches, caterers, grocery stores, nursing homes, camps, and prisons.

Table 3: Number of Illnesses Associated with Reported Foodborne Outbreaks Resulting from Foods Prepared in Restaurants, Private Homes, Schools, and in Other Locations, 1973-1999

Location of food preparation	Outbreaks	Illnesses	Illnesses per outbreak	Percent of outbreaks with 50+ illnesses
Restaurant	8,465	148,548	17.5	7.3%
Private home	2,404	30,198	12.6	3.8%
School	547	46,461	84.9	50.5%
Other	3,704	207,191	55.9	25.0%
Unknown	711	15,085	21.2	9.8%
Total	**15,831**	**447,483**	**28.3**	**12.5%**

Source: GAO analysis of CDC data.

Table 4: Number of Illnesses Associated with Reported Foodborne Outbreaks Resulting from Foods Prepared in Restaurants, Private Homes, Schools, and in Other Locations, by State, 1973-1999

State	Restaurant	Home	School	Other	Unknown	Total
Alaska	11	68	2	27	29	137
	8.0%	49.6%	1.5%	19.7%	21.2%	100.0%
Alabama	90	15	12	18	1	136
	66.2%	11.0%	8.8%	13.2%	.7%	100.0%
Arkansas	8	1	3	13	0	25
	32.0%	4.0%	12.0%	52.0%	0%	100.0%
Arizona	37	21	7	35	3	103
	35.9%	20.4%	6.8%	34.0%	2.9%	100.0%
California	533	231	27	305	61	1,157
	46.1%	20.0%	2.3%	26.4%	5.3%	100.0%
Colorado	59	21	2	33	4	119
	49.6%	17.6%	1.7%	27.7%	3.4%	100.0%
Connecticut	102	41	21	89	8	261
	39.1%	15.7%	8.0%	34.1%	3.1%	100.0%
District of Columbia	15	2	4	11	0	32
	46.9%	6.3%	12.5%	34.4%	0%	100.0%
Delaware	8	3	2	13	1	27
	29.6%	11.1%	7.4%	48.1%	3.7%	100.0%
Florida	675	122	28	181	33	1,039
	65.0%	11.7%	2.7%	17.4%	3.2%	100.0%
Georgia	64	22	24	45	8	163
	39.3%	13.5%	14.7%	27.6%	4.9%	100.0%
Hawaii	215	316	6	89	43	669
	32.1%	47.2%	.9%	13.3%	6.4%	100.0%
Iowa	48	20	3	26	2	99
	48.5%	20.2%	3.0%	26.3%	2.0%	100.0%
Idaho	42	17	1	18	4	82
	51.2%	20.7%	1.2%	22.0%	4.9%	100.0%
Illinois	292	61	22	176	12	563
	51.9%	10.8%	3.9%	31.3%	2.1%	100.0%
Indiana	43	8	3	40	5	99
	43.4%	8.1%	3.0%	40.4%	5.1%	100.0%
Kansas	30	6	6	16	3	61
	49.2%	9.8%	9.8%	26.2%	4.9%	100.0%
Kentucky	23	15	3	20	7	68
	33.8%	22.1%	4.4%	29.4%	10.3%	100.0%
Louisiana	15	20	9	33	6	83
	18.1%	24.1%	10.8%	39.8%	7.2%	100.0%
Massachusetts	133	28	25	118	19	323
	41.2%	8.7%	7.7%	36.5%	5.9%	100.0%

State	Restaurant	Home	School	Other	Unknown	Total
Maryland	341	47	7	105	15	515
	66.2%	9.1%	1.4%	20.4%	2.9%	100.0%
Maine	37	6	2	30	1	76
	48.7%	7.9%	2.6%	39.5%	1.3%	100.0%
Michigan	236	21	16	80	100	453
	52.1%	4.6%	3.5%	17.7%	22.1%	100.0%
Minnesota	204	53	19	131	11	418
	48.8%	12.7%	4.5%	31.3%	2.6%	100.0%
Missouri	78	13	17	47	3	158
	49.4%	8.2%	10.8%	29.7%	1.9%	100.0%
Mississippi	10	3	2	10	0	25
	40.0%	12.0%	8.0%	40.0%	0%	100.0%
Montana	12	7	2	7	13	41
	29.3%	17.1%	4.9%	17.1%	31.7%	100.0%
North Carolina	44	5	6	46	4	105
	41.9%	4.8%	5.7%	43.8%	3.8%	100.0%
North Dakota	14	12	4	10	4	44
	31.8%	27.3%	9.1%	22.7%	9.1%	100.0%
Nebraska	26	12	2	19	1	60
	43.3%	20.0%	3.3%	31.7%	1.7%	100.0%
New Hampshire	21	3	10	22	2	58
	36.2%	5.2%	17.2%	37.9%	3.4%	100.0%
New Jersey	143	45	13	103	17	321
	44.5%	14.0%	4.0%	32.1%	5.3%	100.0%
New Mexico	52	24	8	23	7	114
	45.6%	21.1%	7.0%	20.2%	6.1%	100.0%
Nevada	13	4	0	8	4	29
	44.8%	13.8%	0%	27.6%	13.8%	100.0%
New York	2,095	349	72	636	67	3,219
	65.1%	10.8%	2.2%	19.8%	2.1%	100.0%
Ohio	463	103	21	144	20	751
	61.7%	13.7%	2.8%	19.2%	2.7%	100.0%
Oklahoma	22	15	5	19	3	64
	34.4%	23.4%	7.8%	29.7%	4.7%	100.0%
Oregon	69	44	10	41	24	188
	36.7%	23.4%	5.3%	21.8%	12.8%	100.0%
Pennsylvania	305	154	24	207	33	723
	42.2%	21.3%	3.3%	28.6%	4.6%	100.0%
Rhode Island	8	10	5	8	2	33
	24.2%	30.3%	15.2%	24.2%	6.1%	100.0%
South Carolina	33	13	2	17	2	67
	49.3%	19.4%	3.0%	25.4%	3.0%	100.0%
South Dakota	10	6	1	5	0	22
	45.5%	27.3%	4.5%	22.7%	0%	100.0%

State	Restaurant	Home	School	Other	Unknown	Total
Tennessee	45	18	8	27	2	100
	45.0%	18.0%	8.0%	27.0%	2.0%	100.0%
Texas	104	25	15	53	43	240
	43.3%	10.4%	6.3%	22.1%	17.9%	100.0%
Utah	22	25	3	9	0	59
	37.3%	42.4%	5.1%	15.3%	0%	100.0%
Virginia	94	37	13	80	11	235
	40.0%	15.7%	5.5%	34.0%	4.7%	100.0%
Vermont	23	10	11	34	0	78
	29.5%	12.8%	14.1%	43.6%	0%	100.0%
Washington	1,233	175	13	238	39	1,698
	72.6%	10.3%	.8%	14.0%	2.3%	100.0%
Wisconsin	217	53	20	134	15	439
	49.4%	12.1%	4.6%	30.5%	3.4%	100.0%
West Virginia	5	10	3	12	1	31
	16.1%	32.3%	9.7%	38.7%	3.2%	100.0%
Wyoming	5	5	2	2	0	14
	35.7%	35.7%	14.3%	14.3%	0%	100.0%
Total	**8,427**	**2,345**	**546**	**3,613**	**693**	**15,624**
	53.9%	**15.0%**	**3.5%**	**23.1%**	**4.4%**	**100.0%**

Source: GAO analysis of CDC data.

Table 5: Reported Foodborne Outbreaks Per 100,000 Population, by State, 1973-1999

State	Averaged population*	Outbreaks	Outbreaks per 100,000 population
Alaska	470,352	137	29.1
Alabama	3,956,482	136	3.4
Arkansas	2,308,471	25	1.1
Arizona	3,322,369	103	3.1
California	26,817,660	1,157	4.3
Colorado	3,173,804	119	3.8
Connecticut	3,208,119	261	8.1
District of Columbia	643,490	32	5.0
Delaware	648,053	27	4.2
Florida	11,364,512	1,039	9.1
Georgia	6,178,926	163	2.6
Hawaii	1,013,593	669	66.0
Iowa	2,860,564	99	3.5
Idaho	989,413	82	8.3
Illinois	11,596,675	563	4.9
Indiana	5,577,565	99	1.8
Kansas	2,444,686	61	2.5
Kentucky	3,652,138	68	1.9
Louisiana	4,134,872	83	2.0

State	Averaged population*	Outbreaks	Outbreaks per 100,000 population
Massachusetts	5,947,932	323	5.4
Maryland	4,554,707	515	11.3
Maine	1,155,308	76	6.6
Michigan	9,344,411	453	4.9
Minnesota	4,294,163	418	9.7
Missouri	5,076,648	158	3.1
Mississippi	2,538,877	25	1.0
Montana	795,590	41	5.2
North Carolina	6,411,032	105	1.6
North Dakota	637,877	44	6.9
Nebraska	1,586,202	60	3.8
New Hampshire	1,000,832	58	5.8
New Jersey	7,670,118	321	4.2
New Mexico	1,413,516	114	8.1
Nevada	1,122,330	29	2.6
New York	18,191,594	3,219	17.7
Ohio	10,913,827	751	6.9
Oklahoma	3,045,248	64	2.1
Oregon	2,747,090	188	6.8
Pennsylvania	11,956,840	723	6.1
Rhode Island	987,165	33	3.3
South Carolina	3,302,812	67	2.0
South Dakota	701,968	22	3.1
Tennessee	4,770,902	100	2.1
Texas	15,816,544	240	1.5
Utah	1,619,082	59	3.6
Virginia	5,816,035	235	4.0
Vermont	531,943	78	14.7
Washington	4,576,553	1,698	37.1
Wisconsin	4,844,758	439	9.1
West Virginia	1,823,926	31	1.7
Wyoming	437,336	14	3.2

Source: GAO analysis of CDC data.

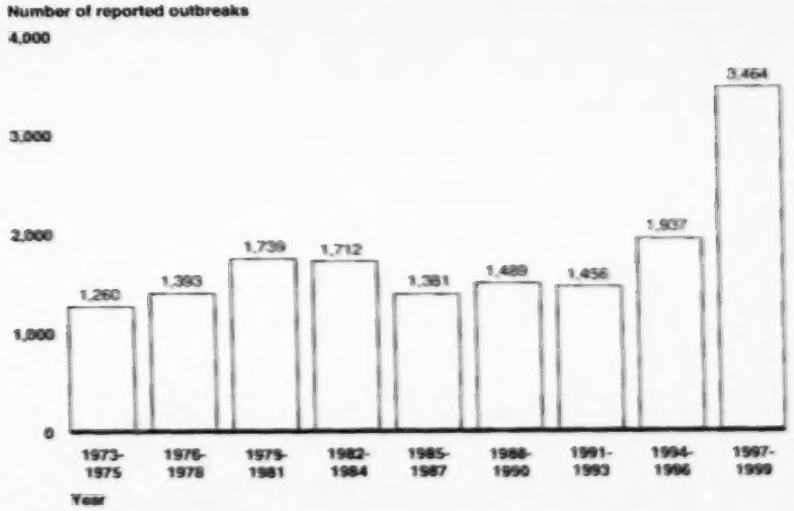
*Population data were obtained from the U.S. Census Bureau. Population is averaged over the 1970, 1980, 1990, and 2000 Census data.

Table 6: Number of Reported Foodborne Outbreaks in Five States Reporting the Largest Numbers, 1973-1999

Year	California	Florida	New York	Ohio	Washington	Total
1973-75	111	47	155	22	148	483
1976-78	120	25	380	13	143	681
1979-81	128	52	530	43	163	916
1982-84	104	49	658	15	125	951
1985-87	100	27	410	19	162	718
1988-90	35	45	335	59	107	581
1991-93	95	38	297	61	221	712
1994-96	176	140	250	232	381	1179
1997-99	288	616	204	287	248	1643
Total	**1,157**	**1,039**	**3,219**	**751**	**1,698**	**7,864**

Source: GAO analysis of CDC data.

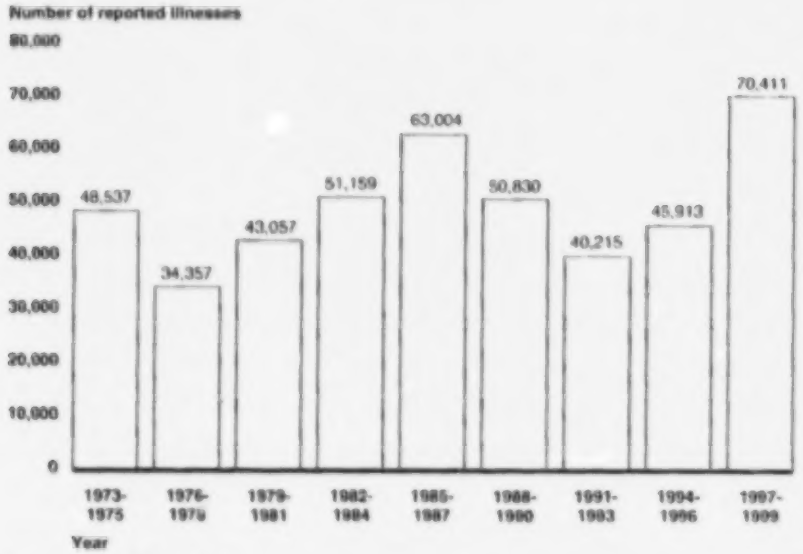
Figure 2: Total Number of Reported Outbreaks, 1973-1999



Source: GAO analysis of CDC data.

Note: For 1997-1999, CDC attributes much of the increases in reported outbreaks to improved data collection procedures initiated in 1998.

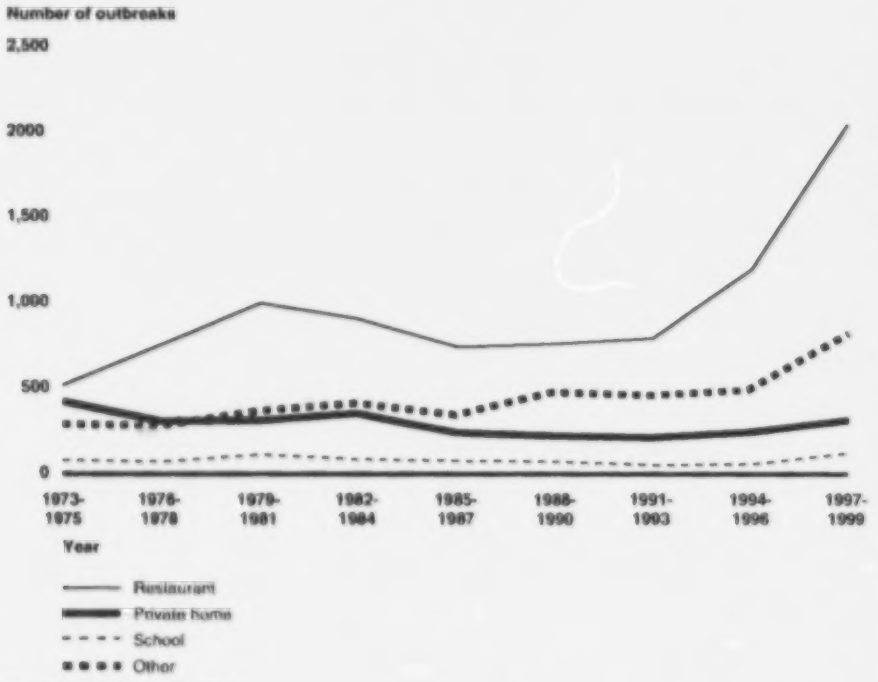
Figure 3: Total Number of Illness Associated with Reported Outbreaks, 1973-1999



Source: GAO analysis of CDC data.

Note: For 1997-1999, CDC attributes some of the increases in reported outbreaks to improved data collection procedures initiated in 1998.

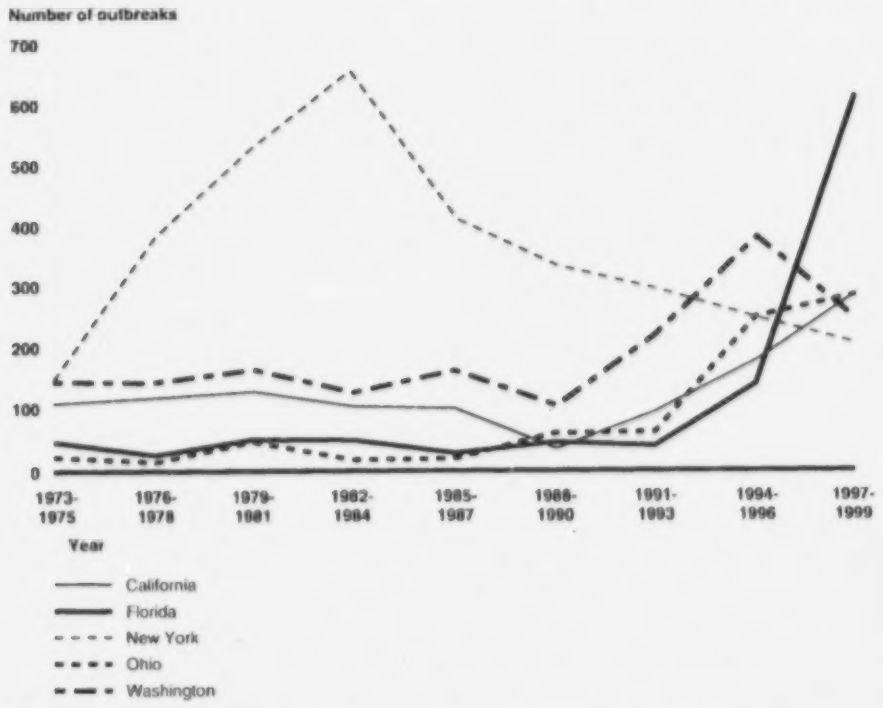
Figure 4: Number of Reported Outbreaks, by Where Food Was Prepared, 1973-1999



Source: GAO analysis of CDC data.

Note: For 1997-1999, CDC attributes some of the increases in reported outbreaks to improved data collection procedures initiated in 1998.

Figure 5: Number of Outbreaks in States Reporting the Largest Number of Outbreaks, 1973-1999



Source: GAO analysis of CDC data.

Note: For 1997-1999, CDC attributes some of the increases in reported outbreaks to improved data collection procedures initiated in 1998. This figure depicts the states reporting the largest number of outbreaks over the time period, not the states with the largest populations.

Appendix IV: Food Safety and Security Practices for School Meal Programs Used or Suggested by Government or Private Sector

School districts, government agencies, and the private sector use or suggest useful food safety and security practices for school meal programs. Table 7 presents these practices, which are classified into two main categories—food safety and food security. For both main categories, the most frequently cited specific categories appears first. For example, for food safety the specific category of training and certification was most frequently cited and thus appears first. Similarly, within each category the most frequently cited practice appears first. Table 7 also describes the food safety or security benefit of each practice and indicates the type of entity that uses or suggests each practice. Some of the practices and suggestions listed in the table may not be practical for all school districts, especially those that are resource-constrained from either the state or local levels.[1]

Table 7 is not intended to be an all-encompassing primer on food safety and security, but rather a compilation of useful practices that we observed or discussed with entities we contacted during our review. Some of the practices cited are components of larger food safety concepts. For more complete information on food safety, FNS suggests that interested parties may reference the extensive support materials prepared by the National Food Service Management Institute, which may be accessed at www.nfsmi.org. As stated earlier, appropriate security practices will be available in the forthcoming FNS security guidelines for schools. FNS believes that some of the practices as cited may not reflect the views of or be endorsed by national school organizations or leaders in food industry. Obtaining such endorsements was beyond the scope of our review.

[1]See U.S. General Accounting Office, *School Meals Programs: Revenue and Expense Information from Selected States*, GAO-03-569 (Washington, D.C.: May 9, 2003).

Table 7: Food Safety and Security Practices for School Meal Programs Used or Suggested by Government or Private Sector

Useful practices and suggestions	Benefits	School districts	Federal agencies	State and local agencies	Private sector
FOOD SAFETY					
1. Training and certification					
Require certification of at least one food service worker in each school kitchen by use of established certification programs or through self- or state-developed courses.	Enhances food safety and establishes a standard for food safety education.	X	X	X	X
Require or provide ongoing documented training for food service workers in food safety topics such as controlling food inventory, handling leftovers, receiving and storing food, using written cleaning and sanitation procedures, maintaining proper temperatures, and packaging.	Reinforces proper food safety practices and facilitates learning.	X	X	X	X
Have local health department monitor certification requirements.	Enforces compliance with food safety requirements.	X	X		X
Use multilingual training courses and post food safety messages in languages other than English or in graphics that do not require language instruction.	Promotes training in and understanding of food safety among all food service workers.	X	X		
Require all food safety trainers to be certified.	Establishes a standard for food safety education.				X
Train workers on critical control points of HACCP at each food service workstation.	Facilitates food safety training.				X
Communicate importance of food safety through video screening that includes children who got sick from foodborne illness.	Facilitates food safety training and reinforces seriousness of impacts of foodborne illness.				X
2. Risk-based food safety concepts					
Mandate and document self-inspections, such as HACCP checklists provided by USDA, at each school.	Promotes use of risk-based food safety procedures and increases monitoring.	X	X	X	X
Have USDA develop and disseminate generic HACCP plans for school districts, such as a template. HACCP plans would be individualized to school's food service operations.	Promotes use of risk-based food safety procedures and establishes a common standard for food safety practices.	X	X		X
Use HACCP-based food safety concepts throughout school food service operations, such as hygiene, time and temperature controls, prevention of cross contamination, documentation, training, and self-inspection.	Promotes use of risk-based food safety procedures and establishes common standard for food safety practices.	X	X		X
Adopt and use standardized recipes with critical control points.	Promotes use of risk-based food safety procedures.	X	X	X	

Useful practices and suggestions	Benefits	School districts	Federal agencies	State and local agencies	Private sector
Record and/or check temperatures of refrigerators, freezers, delivery trucks, and high-risk foods periodically each day, including maintaining temperature and daily production records for support and satellite schools and calibration of thermometers.	Helps ensure proper food preparation, facilitates monitoring, helps detect any spoilage due to improper food holding, and ensures accuracy of food temperatures.	X	X	X	
Provide templates for different types of food preparation, such as cooking meat, reheating foods, using prepackaged meals, and preparing salads.	Promotes use of risk-based food safety procedures and establishes common standard for food safety practices.				X
Adopt food safety measures that exceed the current FDA Food Code, such as maintaining temperature logs, requiring double hand washing by food service workers after they use the rest room, or heating premade or precooked food items, such as pizza, to higher temperatures while retaining food quality and palatability.	Provides additional food safety protection.	X		X	
Require school district authorities to perform food safety inspections of schools twice a month or when visiting schools.	Increases monitoring of schools' food safety practices.	X	X		
Adopt basic health standards for food service employees that handle foods, such as preventing employees who are coughing and sneezing from working.	Minimizes risk of pathogens spread by ill workers.		X	X	
Require suppliers to use HACCP plans or food safety and quality control programs in their manufacturing practices.	Decreases likelihood of receiving contaminated food.		X		X
Incorporate critical control points into school lunch program recipes, which are available on Internet and CD-ROM, and incorporate new food purchasing guidelines into recipes.	Promotes food safety.		X		
Thoroughly wash fresh produce.	Provides additional food protection.				X
3. Food storage, handling, and preparation					
Require food service staff to properly use and change gloves or tongs.	Avoids exposure to any pathogens on hands.	X	X	X	X
Prohibit food deliveries at loading docks that are not supervised by authorized staff.	Prevents potentially contaminated/questionable food products from entering schools.	X	X		X
Develop procedures to address high-risk foods, such as melons, sprouts, unpasteurized eggs, and salad bar items.	Eliminates possible sources of food contamination and reduces likelihood of contamination.	X			X
Require proper cooling procedures, such as breaking down batches of food into shallow serving pans for fast chill, immersing wrapped foods in ice for fast cooling, or using blast chillers.	Minimizes opportunities for pathogen growth.		X	X	X

Useful practices and suggestions	Benefits	School districts	Federal agencies	State and local agencies	Private sector
Spot check deliveries for temperature, labeling, and packaging and record results.	Identifies potentially contaminated incoming food products.		X		X
Mark dates on all delivered items and use oldest inventory first.	Facilitates proper inventory maintenance.	X	X		
Require staff to wear hats or hairnets during food preparation and/or service.	Helps minimize contamination of foods.	X	X		
Use cutting boards that are color-coded by food group and sanitize them after each use accordingly.	Minimizes cross contamination of foods.		X		X
Properly preserve portions of foods served.	Allows later food safety testing if problems are suspected.	X	X		
4. Nonschool meal foods					
Adopt policy of discouraging or prohibiting food prepared outside the school from being served or stored in school facilities.	Minimizes bringing food into schools that is prepared elsewhere.	X	X	X	
Require food service staff to be present whenever school kitchen is used.	Allows proper oversight of school facilities.	X	X		
Cater special events from school food service facility.	Minimizes bringing food into schools that is prepared elsewhere.	X			
5. Product procurement and menu design					
Maximize use of precooked meat and poultry products.	Mitigates *E. coli* O157:H7 and *Salmonella* exposure, reduces labor costs, and removes fat from meat and poultry products.	X		X	X
Eliminate high-risk foods, such as alfalfa sprouts, medium-rare hamburgers, and unpasteurized juices.	Reduces potential for foodborne contamination.		X	X	X
6. Supplier selection					
Select suppliers that use HACCP or are more process control oriented (e.g., HACCP-based) and technologically based.	Provides criteria for selecting better quality suppliers.	X	X		X
Allow flexibility in awarding contracts to the lowest bidder.	Provides flexibility in selecting suppliers.	X	X		
Visit production facilities of all prospective food suppliers.	Helps ensure that suppliers use appropriate food safety practices.	X			
Select suppliers according to food safety performance by consulting past safety records, independent auditing results, supplier facility HACCP plans, microbial testing results of high risk foods and standard operating, storage and recall procedures.	Provides criteria for selecting better quality suppliers and food products.	X			X
Select processors that are approved by USDA and state agencies when contracting for additional processing of USDA-donated commodities.	Provides criteria for selecting better quality suppliers.				X

Useful practices and suggestions	Benefits	School districts	Federal agencies	State and local agencies	Private sector
7. Product specifications					
Award supplier contracts that include food safety requirements, such as third-party microbiological testing before foods are delivered to schools and maximum delivery times.	Provides additional assurance of food quality by requiring proper food holding temperatures and minimizing potentially contaminated food supplies from entering schools.	X		X	
Apply strictest of USDA, state, or local standards in specifications required of processing companies.	Ensures highest standards for food safety.				X
Make food safety-related specifications on AMS Web page more user friendly.	Allows states and districts to use federal procurement expertise.		X		
Apply AMS's procurement specifications for donated commodities that exceed minimum standards of regulatory agencies to schools' commercial food purchases.	Enhances food safety of school children.		X		
Use assistance available from AMS to school districts or states in developing contract or product specifications.	Allows states and districts to use federal procurement expertise.		X		
Have state education department and local health agencies collaborate in establishing bacteriological standards for vendor contracts.	Provides schools with expertise from relevant agencies for purchasing food products.		X		
Review microbial testing guidelines of manufacturers.	Ensures adequacy of testing standards.				X
Perform microbiological testing of food products after delivery to schools.	Provides additional assurance of food quality.	X			
Serve only domestic products in school meal programs.	Eliminates threat of pathogens from foreign countries.		X		
8. Auditing/monitoring suppliers					
Require AMS or other third-party review of production facilities used by new and repeat vendors or food service management companies.	Helps ensure that suppliers use appropriate food safety practices.	X	X		
Require food service management companies to provide information on their suppliers by revising federal prototype.	Facilitates trace back of contaminated food.	X			
Monitor suppliers throughout contract terms, perform monthly product testing, and work with suppliers to correct defects.	Helps ensure that suppliers use appropriate food safety and security practices.				X
Include trace back provisions in supplier contracts and require suppliers to notify when it provides products not from preapproved sites.	Facilitates traceback of contaminated food.		X		X
Perform routine monitoring of contract specifications to obtain supplier's compliance with terms of contract.	Helps ensure that suppliers use appropriate food safety and security practices.				X
Use product specifications and routine monitoring of suppliers to ensure bacterial control of critical items, such as ground meat and poultry.	Helps ensure that suppliers use appropriate food safety and security practices.		X		X

Useful practices and suggestions	Benefits	School districts	Federal agencies	State and local agencies	Private sector
Compare school vendor performance information with that of surrounding school jurisdictions.	Helps ensure that foods are purchased from reputable suppliers.	X			
Require food brokers and manufacturer representatives to inspect processors for quality.	Provides additional food quality assurance.	X			
Require suppliers to have third-party food safety inspections at least once a year.	Helps ensure that suppliers use appropriate food safety and security practices.				X
9. Equipment and facilities					
Use coolers that minimize temperature fluctuations, such as those with plastic strips in doorways.	Facilitates maintaining proper food storage temperatures.	X			X
Install internal doors that have pressurized air curtains and bug lights.	Reduces pest infestation				X
Install computer-controlled disinfectant dispensers on sinks.	Ensures proper strength of disinfectants.				X
Install hand sanitizer dispensers in lunch room to allow quick hand washing for time-constrained students.	Encourages proper personal hygiene.	X			
Use a metal detector to identify metal fragments in food.	Detects potentially dangerous foreign objects in foods.	X			
Use temperature monitors that withstand power outages.	Facilitates maintaining proper food storage temperatures.		X		
10. Recalls					
Apply federal recall notification procedures for donated foods to schools' commercial food purchases.	Faster notification of all recalls, including commercial recalls.	X	X		
Add additional state notification points to federal notification system.	Faster notification of recalls to other interested parties.		X	X	
Implement state fax and e-mail system to immediately send recall information to schools.	Faster notification of recalls within states.			X	
Register for direct e-mail notification of USDA recalls.	Faster notification to schools of recalls.	X			
Monitor recalls on federal agency and other Web sites or newsletters.	Facilitates faster and appropriate response to recalls.				X
Monitor supplier and distribution information for effective communication during recalls.	Facilitates faster and appropriate response to recalls.				X
Develop state computerized electronic purchasing system linked to local schools that is tied into FSIS recall system.	Promotes notification to schools of recalls.		X		
Develop memorandum of understanding to allow FSIS to give suppliers' distribution data on recalled products to states.	Facilitates faster notification of recalls.		X		
11. Health inspections					
Conduct health inspections of food service operations two or more times annually.	Provides enhanced health department oversight.	X		X	

Useful practices and suggestions	Benefits	School districts	Federal agencies	State and local agencies	Private sector
Use HACCP format for health inspections of school and central production facilities.	Ensures that critical food safety items are addressed during health inspections.	X		X	
Require schools to immediately notify school district's food service directors of health inspection results.	Facilitates faster corrective actions.	X			
Require larger schools to consult with health departments and perform inspections and monitoring of food safety management at least annually	Provides health department assistance and quality assurance in schools.				X
12. Traceback					
Require vendors to be able to trace all products back to suppliers.	Facilitates tracing of contaminated foods.		X		
Require suppliers to deliver all products to central or county warehouses where practical.	Facilitates tracing of contaminated foods.	X			
FOOD SECURITY[a]					
Require background checks of food service workers.	Lessens opportunities for intentional contamination.	X		X	X
Restrict visitor access to kitchens and/or escort visitors in food preparation areas.	Lessens opportunities for intentional contamination.	X	X	X	
Secure food preparation and storage areas when not in use.	Lessens opportunities for intentional contamination.	X	X		X
Require locks on all refrigerators, freezers, and/or ice machines.	Lessens opportunities for intentional contamination.	X	X		X
Purchase food from reputable vendors.	Decreases likelihood of receiving adulterated products.	X	X	X	
Verify the identity of food deliverers.	Identifies unauthorized personnel.	X	X		X
Disseminate FDA security guidelines to schools.	Promotes food security awareness.			X	
Discuss security procedures with suppliers.	Promotes food security awareness.	X	X		
Select suppliers with security statements ensuring a site security plan, security cameras, perimeter guards, and employee identification.	Helps ensure that suppliers use appropriate food security practices.		X		X
Inspect food shipments upon arrival.	Provides opportunity to identify intentional contamination.	X	X		
Require vendors to seal products in tamper evident packaging.	Facilitates identification of contaminated products.	X	X		
Complete a product evaluation form for unacceptable products and possibly disqualify suppliers who exceed a prescribed number.	Facilitates monitoring of food shipment quality.	X	X		
Incorporate security measures in food safety audits.	Focuses attention on food security.				X
Disseminate USDA's poster and flyer on food security to schools.	Promotes food security awareness.		X		
Disseminate AMS's paper on security measures, such as sealing delivery trucks.	Promotes food security awareness.		X		

Useful practices and suggestions	Benefits	School districts	Federal agencies	State and local agencies	Private sector
Provide ongoing training in food inventory controls, handling leftovers, receiving and storing food, and packaging.	Promotes foodsecurity awareness.	X			
Install facility access controls, such as coded locks and entry intercoms at all food production areas.	Lessens opportunities for intentional contamination.	X			
Visit suppliers to check for security measures and ensure that all products originate from known suppliers.	Helps ensure that suppliers use appropriate food security practices.				X
Require background checks of distributors' employees.	Lessens opportunities for intentional contamination.	X			

Source: GAO.

[a]Private sector sources we contacted are Chef America, Jack in the Box, Sodexho, and Walt Disney World.

[b]Many food security practices may also be characterized as food safety practices.

The following provides additional information on the supplier-related food safety practices described in table 7. Three food supplier-related safety practices could be valuable to school districts that have resources to implement these practices and have commercial influence over their suppliers. The first practice—selecting suppliers that employ good food safety principles and procedures—was used by three entities we contacted. For instance, Walt Disney World restaurants have a Vendor Food Safety Program to screen new vendors and monitor existing vendors. The company stated that it requires food safety evaluations of its potential vendors, including *E. coli* O157:H7 testing of vendors' high-risk foods, such as beef patties. In addition, the company reviews the Sanitation Standard Operating Procedures, recall procedures, and HACCP plans of the operating facilities of prospective suppliers. Moreover, officials of the Veterans Health Administration told us that they require their vendor to conduct safety inspections of all warehouses and refrigerated trucks and to notify all Veterans Health Administration facilities of any food recalls within 24 hours. In addition, vendors are required to be able to trace all products back through their suppliers to help track information during foodborne outbreaks. Finally, according to Jack in the Box, all of its potential suppliers are required to have HACCP-based food safety processes.

A second practice—requiring product safety specifications of suppliers—was used by three entities we contacted. An official at Jack in the Box told us that the company requires product specifications for different types of food purchases depending on whether they are raw, ready to eat, or to be heated prior to serving. The company's beef safety program requires that

potential suppliers meet certain criteria for microbiological testing of meat samples for bacteria such as coliform, *E. coli* O157:H7, *Listeria monocytogenes*, *Salmonella*, and *Staphylococcus aureus*. In addition, suppliers are required to report data on the age, bone weight, and number of foreign objects detected in hamburger patty supplies. Similarly, Walt Disney World said that it has a zero tolerance policy for *E. coli* O157:H7 and *Salmonella* in children's beef patties. The company also trains smaller vendors on how to furnish products that meet its requirements and requires suppliers to inform it when any products from unapproved production sites are substituted. According to officials at Sodexho, the company also has product safety specifications and reviews the microbial guidelines of its suppliers to ensure that products meet specifications.

A third practice—monitoring suppliers' performance to ensure compliance with food safety requirements—was used by two entities we contacted. Jack in the Box's monitoring program consists of auditing all suppliers twice a year to examine product safety and quality, employee safety practices, facilities, and equipment. The audits are designed to evaluate specific products and the respective processes used for their production. For example, hamburger patty samples are regularly evaluated for compliance with physical and chemical specifications. Suppliers must meet a minimum score to pass an audit. In addition, suppliers are rated according to their performance in these audits and other product quality evaluations. Those that receive unsatisfactory ratings must demonstrate improvement or are no longer allowed to supply the company. Sodexho officials told us that it also has a supplier-monitoring program. The company's Food Safety Team requires safety inspections of all food vendors by a third-party auditor. Sodexho said that it provides its food suppliers with a list of approved auditors. As an additional quality and safety measure, the company said that it monitors the auditors' efforts by randomly shadowing them during their vendor audits. The auditors examine suppliers' management practices, safety capacity of suppliers' manufacturing facilities, product compliance with regulatory requirements and specifications, and effectiveness of suppliers' quality control measures in ensuring consistent performance. Sodexho officials told us they also conduct monthly testing of their products for quality and safety and works with suppliers to correct defects. The company also assigns staff to monitor supplier product information during food recalls.

Appendix V: Comments from the Department of Health and Human Services

DEPARTMENT OF HEALTH & HUMAN SERVICES

Office of Inspector General

Washington, D.C. 20201

APR 21 2003

Mr. Lawrence J. Dyckman
Director, Natural Resources
and Environment
United States General
Accounting Office
Washington, D.C. 20548

Dear Mr. Dyckman:

Enclosed are the department's comments on your draft report entitled, "School Meal Programs: Few Instances of Foodborne Outbreaks Reported, but Opportunities Exist to Enhance Outbreak Data and Food Safety Practices." The comments represent the tentative position of the department and are subject to reevaluation when the final version of this report is received.

The department provided several technical comments directly to your staff.

The department appreciates the opportunity to comment on this draft report before its publication.

Sincerely,

Dennis J. Duquette
Acting Principal Deputy Inspector General

Enclosure

The Office of Inspector General (OIG) is transmitting the department's response to this draft report in our capacity as the department's designated focal point and coordinator for General Accounting Office reports. The OIG has not conducted an independent assessment of these comments and therefore expresses no opinion on them.

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Comments of the Department of Health and Human Services to the General Accounting Office's Draft Report, "School Meal Programs: Few Instances of Foodborne Outbreaks Reported, but Opportunities Exist to Enhance Outbreak Data and Food Safety Practices" (GAO-03-530)

The Department of Health and Human Services appreciates the opportunity to comment on this draft report.

GAO Recommendation

To improve nationwide data on the frequency and causes of foodborne illness associated with the federal school meal programs, we recommend that the Secretary of Health and Human Services require the Director of the Centers for Disease Control and Prevention to revise the voluntary foodborne outbreak reporting mechanism. Specifically, states should be prompted to specify whether reported outbreaks involved foods served through the federal school meal programs.

Department Response

National surveillance for foodborne disease outbreaks was established by the Centers for Disease Control and Prevention (CDC) in the 1960s to collect information that is broadly useful for promoting public health. The CDC has worked diligently in recent years to improve surveillance for foodborne disease outbreaks, achieving a nearly 3-fold increase in the number of outbreaks reported and converting reporting to a rapid web-based system. The CDC is committed to maintaining and continually improving surveillance for this important health outcome.

The current system for reporting is voluntary and depends on the willingness and ability of local health officials to obtain and report the requested information. Mindful of the demands that reporting places on local officials, CDC has not made a practice of adding questions that pertain only to specific settings (e.g., schools, prisons, restaurants, private homes) or commodities (e.g., ground beef, romaine lettuce, egg products).

However, the current GAO draft report indicates that many state health officials are willing to collect and report additional information on the source of items implicated in school-associated outbreaks. The CDC is amenable to changing current data screens to capture this information. To this end, CDC has already taken the following steps:

1) Requested from U.S. Department of Agriculture a definition for "federal school meal" items so that state and local health officials can properly categorize implicated food items
2) Drafted questions for capturing this information
3) Verified the feasibility of adding these questions to the appropriate fields of the Electronic Foodborne Outbreaks Reporting System.

Before implementation, additions to the data collection form will require the approval of the Office of Management and Budget.

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Appendix VI: GAO Contacts and Staff Acknowledgments

GAO Contacts

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